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ABSTRACT

This report presents the results of a project designed to assist the Department of Education, Office of Libraries and Learning Technologies (OLLT), and the wider community serves to identify research priorities for the 1980s in the field of library and information science. The rationale for establishing a national research agenda for the 1980s is discussed, and definitions of library science, information science, and research are presented. The project design and methodology are described, with special emphasis on the nature and function of the centerpiece of the project, a 3-day meeting at which carefully selected library and information science professionals evaluated and ranked topics for research in order to establish a Research Agenda. A summary report of this meeting is included as well as the Research Agenda, which is made up of 20 projects in four broad areas, and discussion of interpretations and possible uses of the Research Agenda. A list of meeting participants, 13 tables, and a 55-item bibliography accompany the text. Appended to the report are the results of a literature scan on library information science research, full descriptions of research agenda projects, and summaries of non-agenda projects. (JL)

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A LIBRARY AND INFORMATION SCIENCE RESEARCH AGENDA FOR THE 1980s:

FINAL REPORT

February, 1982

Prepared by

Cuadra Associates, Inc.

This project was conducted under contract (Number 300-81-0022), to the Department of Education, Office of Libraries and Learning Technologies. The views and opinions expressed herein do not necessarily reflect those of the U.S. Government.

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PREFACE

This project was conducted for the Department of Education, Office of Libraries and Learning Technologies (OLLT), under Contract Number 300-81-0022. Dr. Carlos A. Cuadra, President of Cuadra Associates, Inc. (CA), was Project Director, and Judith Wanger, Vice President of CA, was the Associate Project Director. Other project team members were Mary C. Berger, David M. Abels, and Joseph W. Haaf.

The purpose of this report is to document in a comprehensive way both the process and the substance of the "Library and Information Science Research Agenda for the 1980s" project. Although the outcome of this year-long study is of primary importance to the field of library and information science, a record of the project itself is also required, to show how the final product--the Research Agenda--was developed.

Those readers who are interested primarily in the results of this project may want to focus their attention first on Chapters V and VI, which report on the Research Agenda and on possible uses and interpretations of the research priorities represented in the Research Agenda. Readers are also referred to a separate brief volume, A Library and Information Science Research Agenda for the 1980s: Summary Report, which was prepared to help disseminate the results of this project more widely.

ACKNOWLEDGEMENTS

The project team wishes to express appreciation, on behalf of the library and information science community, to the Office of Libraries and Learning Technologies staff for developing and supporting this study and for giving the project participants and project staff the freedom to express their views and priorities without restriction, expressed or implied. This type of project is extremely important to our discipline's growth and vitality.

We would also like to acknowledge the support and contributions of many of our colleagues in the field, who shared with us their views on library and information science research needs, who volunteered their support, made suggestions for areas of inquiry to be be considered by the project participants, and offered guidance and counsel on the organization and dissemination of the project findings. In this report, as in the conduct of the project, we have attempted to represent and take into account the many views and perspectives that were shared with us.

A special acknowledgement should be made to a number of representatives of library and information science associations and organizations who participated in an OLLT-sponsored Colloquium and provided valuable feedback on our draft report and the implications of the Research Agenda for their constituents. Their views helped to shape this final report, as well as a special report, A Library and Information Science Research Agenda for the 1980s: Summary Report, created to provide widespread awareness of the project, its results, and the implications for further use by various audiences.

Extensive assistance in helping the authors prepare the final manuscripts for these reports was provided by Marie E. Callaway, an intern from UCLA, Graduate School of Library and Information Science, and by Jane V. Bodjanac and Gloria N. Cuadra, members of the CA secretarial staff.

The largest debt of gratitude goes to the 26 researchers and practitioners from our field who agreed to be our "project participants" and who are the chief architects of the Research Agenda. These individuals were carefully selected by OLLT and the project team to represent the leadership in our

field and to give the project the benefit of a broad array of perspectives and expertise. The 15 project participants who served as researchers prepared a total of 88 draft project descriptions, to be used as the basic stimulus material for an intensive, three-day meeting held in a retreat environment. These participants, along with 11 practitioners, served in this meeting as reviewers and evaluators on behalf of the library and information services community and not as advocates for the projects that they had developed. They more than fulfilled our expectations in their contributions to the project. Although they, as well as the Colloquium attendees and members of the OLLT stafff, have reviewed a draft of this report, responsibility for the presentation that follows necessarily remains with the Cuadra Associates project staff.

The team of experts who participated in this project are listed below. In cases where individuals have changed their institutional affiliations since the time of their selection as participants in this project, we provide both present and past affiliations. Following each name and affiliation is an indication of whether the individual served on the project as a "Researcher" or "Practitioner." In keeping with their desire for the Research Agenda to stimuluate discussion and debate about research priorities throughout the library and information science community, the authors are not identified with individual projects. We hope that the "group authorship" for the Research Agenda will help to generate a similar sense of ownership throughout the profession for many of the ideas and needs that have been articulated in the course of developing the Research Agenda. The participants were:

Shirley Aaron, Associate Professor, School of Library Science, The Florida State University, Tallahassee, Florida. *[Researcher]*

D. Philip Baker, Coordinator of Library Media Programs, Stamford Public Schools, Stamford, Connecticut. *[Practitioner]*

Marcia J. Bates, Associate Professor, Graduate School of Library and Information Science, University of California, Los Angeles, California (FORMERLY: Associate Professor, School of Librarianship, University of Washington, Seattle, Washington). *[Researcher]*

Ching-chih Chen, Professor and Associate Dean, Graduate School of Library and Information Science, Simmons College, Boston, Massachusetts. *[Researcher]*

Robert L. Clark, Director, The Oklahoma Department of Libraries, Oklahoma City, Oklahoma. *[Practitioner]*

Pauline Atherton Cochrane, Professor, School of Information Studies, Syracuse University, Syracuse, New York. *[Researcher]*

Michael D. Cooper, Associate Professor, School of Library and Information Studies, University of California, Berkeley, California. *[Researcher; not a meeting participant]*

Evelyn H. Daniel, Dean, School of Information Studies, Syracuse University, Syracuse, New York. *[Researcher]*

Keith Doms, Director, Free Library of Philadelphia, Philadelphia, Pennsylvania. *[Practitioner]*

Kenneth E. Dowlin, Director, Pikes Peak Library District, Colorado Springs, Colorado. *[Practitioner]*

Miriam Drake, Assistant Director, Library Support Services, Purdue University Libraries, West Lafayette, Indiana. *[Practitioner]*

Douglas Ferguson, Manager, Research Libraries Group, Inc., Stanford, California. *[Practitioner]*

Marilyn Gell Mason, Metrics Research Corporation, Atlanta, Georgia (FORMERLY: President, Gell & Associates, Inc., Washington, D.C.). *[Researcher]*

Robert M. Hayes, Dean, Graduate School of Library and Information Science, University of California, Los Angeles, California. *[Researcher]*

F. Wilfrid Lancaster, Professor, Graduate School of Library and Information Science, University of Illinois at Urbana-Champaign, Urbana, Illinois. *[Researcher]*

Barbara Lawrence, Head, Information Services Unit, Medicine and Environmental Health Department, Exxon Corporation, East Millstone, New Jersey. *[Practitioner]*

Jay K. Lucker, Director of Libraries, Massachusetts Institute of Technology, Cambridge, Massachusetts. *[Practitioner]*

Mary Jo Lynch, Director, Office for Research, American Library Association, Chicago, Illinois. *[Practitioner]*

Barbara Evans Markuson, Executive Director, Indiana Cooperative Library Services Authority (INCOLSA), Indianapolis, Indiana. *[Practitioner]*

William Paisley, Professor, Institute for Communication Research, Stanford University, Stanford, California. *[Researcher]*

Vernon E. (Gene) Palmour, Senior Vice President, King Research, Inc., Rockville, Maryland. *[Researcher]*

W. David Penniman, Director, Development Division, OCLC Online Computer Library Center, Inc., Dublin, Ohio. *[Researcher]*

Jane Robbins-Carter, Director, Library School, University of Wisconsin-Madison (FORMERLY: Dean, Graduate School of Library Science, Louisiana State University, Baton Rouge, Louisiana). *[Researcher]*

Peter B. Schipma, Scientific Advisor and Adjunct Associate Professor of Science Information, IIT Research Institute, Chicago, Illinois. *[Researcher]*

Loene Trubkin, President, Data Courier, Inc., Louisville, Kentucky. *[Practitioner]*

Herbert S. White, Dean, School of Library and Information Science, Indiana University, Bloomington, Indiana. *[Researcher]*

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I. EXECUTIVE SUMMARY

This report presents the results of a project sponsored by the Department of Education, Office of Libraries and Learning Technologies (OLLT), and carried out by Cuadra Associates, Inc. The purpose of the project was to assist the Department, and the wider community that it serves, in identifying research priorities for the 1980s in the field of library and information science.

Summary of Chapter II. INTRODUCTION AND BACKGROUND

Although there has been considerable variation over the past decade in the pattern of research funding for library and information science, one can foresee a period of austerity in federal funding, over the next five to ten years. It is important, therefore, that public investment in research have the highest payoff possible. This means that there will need to be better planning, to ensure that available research funds are directed to research areas where they will have the greatest potential impact, and better coordination, to avoid duplication of effort. In addition, steps must be taken to revitalize the commitment to research and to develop a broader base of support for its sponsorship. These changes are not likely to occur solely from the publication of the research agenda produced through this project, but critical examination and review of this report can help us to move toward those goals with greater assurance and speed.

The original title of this project referred to a "national" research agenda, to help convey the idea that the research to be proposed should address areas of broad concern and major potential impact. This idea was useful as part of the context for planning the project but, to avoid implication that the research agenda to be described is federally proposed or federally endorsed, we will hereafter refer to it simply as the "Research Agenda."

As further context for this project, broad definitions of "library and information science" and of "research" were developed. Although there are strong differences embedded in the tradition of librarianship and library science, on one hand, and in information and information science, on the other, there are also areas of strong common interest and concern. One fundamental shared concern is with facilitating the use of information in all forms, either directly, by providing library or information services, or indirectly, by studying ways to improve those services. The focus, in the present study, on library and information services was intended to encompass the entire spectrum of public and private settings in which such services are provided. In a similar vein, "research" was defined in terms that, while retaining the essential concept of "systematic investigation of a problem," encompass many different approaches, from experimental and quantitative studies and methods to conceptual and qualitative ones.

Summary of Chapter III. REVIEW OF PROJECT METHODOLOGY

The centerpiece of the project design was a three-day meeting, the purpose of which was to have a group of highly respected library and information science professionals (hereafter referred to as project participants) evaluate and prioritize research projects--the "top 20" of which would comprise the Research Agenda.

Extensive research and communication with project participants preceded this meeting. A background document was prepared by the project staff to help shape the desired scope and coverage of the Research Agenda and to define several central concepts, including "research" and "library and information science." This document was based on an intensive literature review, an analysis of past funding data, and discussions held with about 20 "gatekeepers"--experts in a number of different areas of library and information science and related fields. The results of these efforts are reported in appropriate sections of this document--in Chapters II and III, and in Appendices A, B, and C.

Another major activity was the selection of the 15 researchers and 11 practitioners who served as the project participants. Initially, over 40 individuals were contacted to identify those who would be interested in participating and to learn of or confirm their areas of expertise and specialization. We matched these areas with a preliminary set of research areas and developed various matrices to help achieve the desired balances. With the advice and assistance of OLLT, a final selection was made.

Each of the 15 researchers prepared descriptions of approximately six proposed research projects, in one or more areas. The purpose of these project descriptions was to have available at the Research Agenda meeting stimulus material that would help the participants to focus their discussion and evaluation on specific, concrete ideas for dealing with important problem areas. Draft descriptions of the projects, prepared within a two-month period, were distributed to all participants, for their review and initial evaluation. Their evaluations were the starting point for the discussions and rating sessions held during the meeting.

Summary of Chapter IV. SUMMARY REPORT OF THE RESEARCH AGENDA MEETING

The Research Agenda meeting was held in July 1981, in a retreat environment in Virginia. The overall meeting plan, which included both small-group workshops and plenary sessions, was designed to facilitate discussion and evaluation of the research proposals and selection of the Research Agenda.

Since project participants had been selected, in part, on the basis of their diversity, there was no expectation for achieving complete agreement. Their diversity was reflected in the results of the pre-meeting ratings, in which the majority of proposed projects had attracted all five points on the rating scale that was used. At the meeting, emphasis was placed on communication among participants, to ensure that their different perspectives and value systems were shared, as the relative merits of individual projects projects and program areas were discussed. A number of criteria were applied in evaluating the projects, including their relevance to the field of library and information science, the plausibility and technical soundness of their methodology, their scope and size, and their potential impact. An important theme throughout the meeting was the need to achieve a "balance" in the mix of projects that were to constitute the Research Agenda.

The initial ratings and discussions resulted in the selection of a preliminary set of 42 projects, out of a total of 101 candidates. This set included the top-rated projects in a number of areas; projects that were combined during the meeting to help represent multifaceted program areas; a few new projects developed at the meeting; and projects that were not top-rated but which, on further review by the group, were "upgraded" for consideration in the final ratings. A final set of ratings completed by each participant was tabulated and then reviewed by the entire group, to identify the 20 Research Agenda projects.

Summary of Chapter V. PRESENTATION OF THE RESEARCH AGENDA

The Research Agenda comprises 20 projects, in four broad areas. Three of the projects include two or more sub-projects. No ranking is implied by the sequence of areas and projects. The project numbers are given to facilitate location of the full project descriptions in Appendix D.

Information Generation and Provision of Library and Information Services

03. Exploiting the True Capabilities of Electronic Publication

04. An Online Network to Support Question Answering in Libraries

54. Information Transfer at an Online Reference Desk in a Public Library Setting--Design Considerations for Staff and Patron

100. The Role of Libraries in Creating and Providing Viewtext Information Services:

     Role of the Community Library as Viewtext Information Providers

     Impact of Viewtext Systems on Traditional Reference Functions of the Community Library

Information Users and Uses

09. Techniques for Marketing Library and Information Services

18. Development of a Conceptual Framework for Observation Of User Behavior with Online Information/Data Systems

19. The Influence of Selected Information Search Mechanisms On User Behavior

21. Evaluation of the Changing Needs of Online Search System Users as Influenced by Search Systems Experience

37. Consumer Behavior Research Applied to Libraries

55. Direct and Quick Information Retrieval Service in a School Setting

58. Information Seeking in High and Low Scatter Fields

64. From Childhood to Adolescence; Changing Information Needs

78. Impact of the "New Literacy" on the "Knowledge Gap" between Demographic Groups

Economics of Information and of Library and Information Services

11. Alternative Funding Possibilities for Publicly Supported Library and Information Services

31. Impact of Information on Industrial Productivity

32. Impact of Public Libraries on Community Productivity

84. Economic Value of Investment in Information

94. Costs and Cost Analysis of Library and Information Services:

    Elements of Cost in the Production and Dissemination of Information

    Cost-Accounting Standards

    Development of Cost and Performance Models for Evaluating Library Automation Programs

Education and Professional Issues

47. A Study of Selected Organized Groups Which Actively Promote Censorship of Materials in Public Libraries and Schools

97. Dissemination and Diffusion of Library and Information Science Research and Practice:

    Analysis of Effective Researcher-Practitioner Linkages in the Library/Information Field

    Diffusion of Innovation in Librarianship

    "Pathfinders": The Diffusion of an Information Innovation

    Diffusion of Social/Behavioral Sciences Research Methods into Information System/Use Studies

Summary of Chapter VI. INTERPRETATION AND USE OF THE RESEARCH AGENDA

Although the Research Agenda does not represent "ready-to-fund" projects or a prescription that should be followed without further development and the exercise of judgment, it does represent one carefully considered statement of proposed research priorities for the library and information science field, at this point in time. As such, it can properly be used to guide and support the allocation and targeting of present and prospective research funds.

The Research Agenda can serve a number of other useful purposes for OLLT and for the profession as a whole. One vitally important way it which it can be used is to stimulate further conceptualization of research needs and priorities in various areas of specialization such as those represented by the various professional and trade associations concerned with library and information science. A highly desirable followup activity would be for groups of expert researchers and practitioners in those areas of specialization to review the Research Agenda projects, in light of their own priorities, and develop in-depth statements about the research needs in their program area, using the Research Agenda projects (and, as well, those of potential merit that were not included in the Research Agenda) as illustrations of or inspiration for the types of project efforts that can meet those needs.

Used in this way, the Research Agenda can help to provide immediate guidance to those institutions and agencies in the field that need and want such guidance in developing their own research agenda.

The special-interest reviews recommended above can also help to identify areas that may not be adequately represented in this Research Agenda. (See Chapter VI and Appendices B and E for suggestions regarding such areas.) In using the Research Agenda in this way, it is important that the focus remain solidly on research. It is not enough to dwell on the importance and seriousness of a problem; we must translate our concerns into questions and/or hypotheses that can be addressed through research. This does not necessarily mean that the ideal study approaches can or must always be specified in advance. If we are to break new ground in research on particularly difficult issues, preliminary work may be needed to develop appropriate theories and methodologies.

One possible outcome from the dissemination and discussion of this Research Agenda could be the development and endorsement by the library and information science community of statements of national-level research priorities. It is not clear, however, from either a theoretical or practical standpoint, whether the various elements in the community can combine forces to define the most productive investments in research, to benefit all institutions and organizations concerned with the principles, theories, and effective practices in library and information services.

The Research Agenda project has drawn sharp attention to a compelling need to improve the dissemination of research results and to improve communications among researchers and between researchers and practitioners. There is also a need to draw the attention of potential research sponsors--both within and outside the library and information science community--to the need for research, to the likely payoff from well-targeted research, and to specific research needs such as those outlined in the Research Agenda. This document (and the Summary volume) can be useful to various groups in communicating with potential sources of funding about research needs and in communicating something of the exciting potential of future library and information service.

Finally, the process and results of the Research Agenda project may draw attention to the need in our profession to improve our capacity to conduct research and our capacity to interpret and use research findings. If we do not work to develop those capacities, the research ideas expressed in the Research Agenda are not likely to be executed well, and the results of research will not be translated into more effective library and information services. Critical discussion and debate now on these and other challenges highlighted in this report can help to stimulate a revitalized and healthy climate for research in our field, for years to come.

II. INTRODUCTION AND BACKGROUND

This report describes and presents the results of a project sponsored by the Department of Education, Office of Libraries and Learning Technologies, and carried out by Cuadra Associates, Inc. The purpose of the project was to assist the Department, and the wider community that it serves, in identifying research priorities for the 1980s in the field of library and information science. The report outlines the problem, describes the method by which the project addressed this problem, and presents and interprets the results.

A. WHY THE NEED FOR RESEARCH PRIORITIES?

It is widely believed that funds available for government and other national-level support of research, development, and demonstration in the field of library and information science declined sharply during the 1970s. This perception is not altogether accurate. To be sure, the funds available for research that many librarians would consider directly relevant to their problems and challenges have been decreasing, whereas the funds for information science (or, more accurately, science information) have largely held steady from the one organization that provides major support for such research, the National Science Foundation. But the overall picture of funding patterns over the past decade is rather mixed. Some organizations have reduced their levels of funding; others have increased them; and others display a highly variable pattern of funding, with sharp changes from year to year. Such changes make it difficult to generalize about the status of research funding for library and information science.

The problem is complicated by the difficulty in drawing clear, clean lines between research, on the one hand, and development and demonstration, on the other. Some projects described as research are, in fact, largely demonstrations, and other projects considered to be developmental still require answers to one or more fundamental questions. It is even more difficult to determine the value of past and current research (however defined), because of the many different frames of reference within the library and information science community. What can be concluded, regardless of one's definition of library and information science research, is that, although the United States is developing into the world's first "information economy," the reputedly growing importance of information products and services is not reflected in the level of research funding associated with them.

Another factor that has helped to contribute to the mixed perceptions about research funding is the investment being made in the private sector--in the information industry. As more and more companies become involved in providing new technology-based information services for business and the home, they have undertaken the research necessary to support the development of those services. It is important for us to distinguish this kind of proprietary research from the type of research that is conducted, on behalf of the public, to enrich the nation's store of knowledge. This distinction is not simply one between basic and applied research. It has to do with the critical question of who will have access to the research data and what use can be made of those data.

However important private-sector investments may be to the total information research picture, they cannot be considered as a replacement for "public" investments in library and information science research. The dramatic growth of new information products and services over the past decade has, in fact, generated an increasing need for research, to show their impact--for better or worse--on the more traditional information resources and services and to help us understand better the ways that they are or should be integrated into the information-generation-to-use cycle.

Whatever the funding patterns have been in the past for publicly funded library and information science research, we are likely to face a period of austerity during the next five to ten years. It is vitally important, therefore, that whatever the level of public investment in library and information science research is to be, that investment should have the highest payoff possible. This calls for concerted planning, with careful attention to priorities.

The Department of Education, Office of Libraries and Learning Technologies, has recognized these needs and has drawn three major conclusions, as part of the context for the present project, aimed at developing research priorities for the 1980s:

(1) Rigorous planning is mandatory to assure that available research funds are directed to the sectors of the library and information profession that most need them

(2) Coordination among all funding sources is imperative to assure that there not be duplication of effort

(3) American library research needs must be documented and clearly communicated to those public and private sector officials who must make funding decisions

At least two other important conclusions must be added. The first is that national-level funding of library and information science research projects of the 1980s must be as relevant as possible to the total information environment of the 1980s and must provide significant leverage in solving the problems to which they are addressed. The decline in government funds in some areas of library and information services research may reflect not only increasing austerity but also misgivings about the productivity and relevance of the type of research heretofore funded. To the extent that such misgivings are justified, the underlying problem must be corrected.

It is useful to introduce here a distinction between two ways of thinking about the use of the results of this Research Agenda project. One can see these results as helping OLLT and other public and private organizations to make the best possible project-selection decisions, on the assumption that research funds will continue to decline. Accepting such an assumption can be likened to a "going-out-of-business" approach. On the other hand, one can envision the present project--and followup activities in disseminating its results--as taking an essential step toward the revitalization of research in library and information science--a revitalization that will involve increasing, rather than declining funds. Even in an age of austerity, a productive investment is a bargain.

It would be naive to imagine that such revitalization will result merely from the publication of a report on this project, particularly since, as several observers have pointed out, past efforts in agenda development appear to have had limited impact. Writing about "Library Research in the 70s; Problems and Prospects," Shaughnessy (1976) noted that a number of attempts have been made in the past to construct "catalogs of research topics that need to be undertaken." He cited as examples Frank Schick's essay, "Library Science Research Needs," which appeared in the Journal of Education for Librarianship (1963); Ralph Blasingame's article, "Some Research Questions," which appeared in Ralph Conant's The Public Library and the City (MIT Press, 1965); and, more recently, Harold Borko's Delphi study, reported in Targets for Research in Library Education (American Library Association, 1973). Shaughnessy concluded that, given the limited impact of these undertakings, it might be fruitless to construct still another "laundry list" of research topics needing prompt investigation, and that the main problem confronting the profession with regard to research is not what we do but, rather, how to communicate the results of research to the field in meaningful ways.

We agree that the development of one more "laundry list" will not, alone effect change in the way that research programs are planned, funded, or disseminated. We also believe that followup actions based on critical examination of this report will be needed to take full advantage of the work behind it. These beliefs were strongly endorsed by the researchers and practitioners who participated in the project and by representatives of major associations and organizations in the library and information science community, in a special Colloquium called by OLLT toward the end of this project, to solicit their views and recommendations on the possible uses of this report.

B. PURPOSE AND SCOPE OF PROJECT

The purpose of this one-year project has been to formulate and prioritize a "library and information science research agenda for the 1980s." The project results--both the "Agenda" and the considerations and concerns raised in its formulation--are intended to help support the development of policy and plans in the Department of Education, Office of Libraries and Learning Technologies (OLLT). It is important to emphasize that the project is perceived by OLLT as only one of many sources of input that are to be used in its planning. As a point of departure, however, the Research Agenda, along with the substance and process of the entire project, could help OLLT to focus its ongoing inquiry on the identification of program areas for which Department of Education leadership--in funding and in the dissemination of information about research and research needs--is most appropriate. It was also believed that the study could be of value to others, including federal, state, and local agencies, professional organizations, research-funding organizations, schools of library and information science, and individual researchers and practitioners, in formulating their own research agendas for the 1980s. It remains to be seen whether the results of this project, in contrast to similar efforts referred to earlier, can also serve as a springboard for discussion and debate throughout the professional community, to help develop a broadly based consensus on directions for research in the 1980s.

The original title of this project was "A Library and Information Science National Research Agenda for the 1980s." The term "national" was intended to convey the idea that the Research Agenda should not focus on projects that were only of local or limited concern. The participants in this project found the distinction useful, because it enabled them to exclude from serious consideration small-scale, limited-effort projects such as might be suitable for a graduate student in a one-quarter course. However, the term "national" can carry the implication that the agenda is a federal agenda or that it is being proposed or endorsed by the federal government. The federal government has indeed provided the funding for this project, but it also provided full freedom for the participants to exercise and offer their own best judgment on the library and information science research needs of the nation. In this report, we will not refer further to the "National Research Agenda" but only to the "Research Agenda."

One of the most challenging tasks faced in this project was to define an appropriate scope of inquiry. The target--a library and information science research agenda--involves two major concepts on which there is less than universal agreement: (1) library and information science, and (2) research. To some, library and information science is a single discipline; others see the library field and the information field as quite distinct from each other.* Similar differences of opinion exist with respect to research. To some, the term research should be applied primarily to inquiries that are experimental, manipulatory, or at least rigorous in their design and execution. To others, the term can encompass a very wide range of inquiries, from historical reviews and theoretical conceptualizations ("desk studies") to demonstration projects.

The definitions of these concepts were of more than academic interest in this project, since the key activities of the project--the description, review, evaluation, and prioritizing of research ideas--required, first, the definition of an appropriate domain of interest and, second, the selection of researchers whose interests, experience, and skills mapped those areas well. It is clear that, if the domain of interest were defined too narrowly or too broadly, the results of the project would necessarily be flawed. The problem, of course, is that no one can say precisely what the "true" domain is. The challenge for this project was not so much to find the true and correct definition of library and information science, nor the true and correct definition of research, but, rather, to develop some well-founded guidance for future library and information science research, in spite of the lack of universal agreement about the domain in which we work.

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*Those who take this view might object to our use of the term "library and information science" in this discussion, since it seems to prejudge the issue. We do so only as a matter of convenience, as the discussion will show.

In order to guide the project team and, later, to guide the researchers and practitioners in carrying out their roles in the project, we examined the literature relating to (1) the concept of library and information science, and (2) the concept of research. The findings and conclusions from this review were documented and shared with the project participants and OLLT, to help provide some common context for the project and to provide a target for comment, criticism, and other feedbck that would be useful in sharpening our mutual perception of the field and the research challenge. This section is a revised and condensed version of materials from this background document that were developed for this purpose. This review is presented at this point to provide the same type of context for the readers of this report.

The Concept of Library and Information Science

In reviewing definitions in this area, a basic question arises: are we defining a single discipline (i.e., library and information science), or are we defining two disciplines (i.e., library science and information science)? There is little agreement on this point. For example, the American Library Association (1972, 1976) uses the term "librarianship" to include "the relevant concepts of information science and documentation" and the term "libraries" to include "current models of media centers, learning centers, educational resource centers, information, documentation, and referral centers." Alan Rees and Tefko Saracevic (1967), on the other hand, state that information science cannot be equated with documentation, information retrieval, librarianship, or anything else. "Information science is not souped-up information retrieval or librarianship any more than physics is supercharged engineering."

In the first volume of the Annual Review of Information Science and Technology (1965), Cuadra, its first editor, commented on the problems of defining the field of "information science and technology."

> Some workers see it as a somewhat glorified, even overblown version of conventional library practice. Some, taking the computer as their intellectual base of operations, view information science in terms of machine manipulations of linguistic, pictorial, or even only numeric data. Others, some of whom call themselves documentalists, view the

> field as neither library science nor computer operations but as a fairly distinct discipline dealing largely with the processing and/or analysis of scientific and technical documents. A small minority, many of them newcomers to the information field, view the activities they see in terms of interpersonal communication. To them, the field is a behavioral one, for which both computer and document handling methods are important but limited aspects.

Cuadra leaned toward the point of view that information science and technology was a new--if still amorphous--area of inquiry and invention with historical antecedents in and technical debts to other fields, including even those such as business data processing and military command and control systems.

Are those cited above really talking about the same single field or the same set of fields? This basic question is only one part of a greater set of complexities and ambiguities in the library and information field that is mirrored in the sometimes indiscriminate and interchangeable use of terms that relate to disciplines (i.e., library science, information science), to institutions (e.g., libraries, information centers, information clearinghouses), and to services (e.g., reference services, literature searching services, publishing). In general, library science is defined primarily in terms of the institutions in which it is practiced, the materials with which it deals, and the services that it provides. The following are typical of the many published definitions:

> Library science (or librarianship) is:
>
> the study of the way libraries select, acquire, catalog, circulate, and make available books and other information. (Becker)
>
> the knowledge and skill by which printed or written records are recognized, collected, organized, and utilized. (ALA, 1943)
>
> the body of organized knowledge which is concerned with the purposes, objectives, and functions of libraries and the principles, theories, methods, organizations, and techniques employed in performing library service. (Gates)

> the knowledge and skill concerned with the administration of libraries and their content; library economy (practical applications of library science to the founding, organizing, and administering of libraries) and bibliography. (Harrod)

Definitions of information science, on the other hand, tend to be broader, as illustrated by the examples below:

Information science is (or encompasses):

> the study of how man creates, uses, and communicates information in all its forms. (Becker)
>
> the investigation of communication phenomena and the properties of communication systems. (Rees and Saracevic)
>
> an interdisciplinary science that investigates the properties and behavior of information, the forces that govern the flow and use of information, and the techniques, both manual and mechanical, of processing information for optimal storage. (Borko, 1968)
>
> the creation, organization, dissemination, and application of knowledge concerning information and its transfer. (ASIS)

Careful analysis shows that some very strong differences are embedded in the traditions of librarianship and library science, on the one hand, and in information and information science, on the other. A crucial difference in these two sets of traditions lies in the degree of commitment to specific institutions of library and information service. Whereas library science is associated with the operations of specific institutions--libraries--information science deals with broadly defined areas of information creation and generation, representation, dissemination and communication, independent of any specific or limited set of means or institutions. That is not to say, however, that information science has no direct relationship to the concerns of libraries as institutions. Much of information science research has, in fact, been done within a library context and draws upon the expertise of those who have been, or are now, involved in library services. Nevertheless, information science does not have a commitment to any specific type of information-service institution.

Our examination of the literature on the relationship between library science and information science leads us to conclude that, although the scope and focus of the two disciplines have differed significantly in the past and continue to differ in many respects, they overlap considerably in their basic concerns and share some of the same traditions, e.g., in promoting greater understanding of how information is created and organized, how it can be disseminated and made accessible to users, and how the overall flow of information can be managed most effectively.

Perhaps the most important area of overlap between library science and information science is the fundamental concern they have with facilitating the use of information, in all forms, either directly, by providing library or information services, or indirectly, by studying ways to improve those services. In outlining the scope of library and information science for purposes of this project, therefore, we chose to concentrate on those aspects of library and information science research that are concerned primarily with library and information service, encompassing the entire spectrum of public and private settings in which these services are provided and all of the target audiences of these services. These settings include government libraries and information centers, public libraries, public and non-public school libraries and media centers, state libraries and state education agencies, regional and subregional libraries for the blind and physically handicapped, information analysis centers and clearinghouses, information brokers, technical information centers, and special libraries in business, industry, law and medicine. We also chose to include within the domain of th[illegible] the supplier community--e.g., private publishers, government [illegible] suppliers such as NTIS and GPO, online services, "home information services," and other kinds of information utilities--at the points where they interface with and impact on the library and information services, users, and institutions.

We recognized the risk that the scope outlined above might prove to be impractically broad, in terms of the project objectives, but we believed (and continue to believe) that, if one is thinking seriously about a research agenda for the next decade, it would be a fatal error to take a narrow or limited view of the institutions and mechanisms that are likely to play a significant role in this time period.

The Concept of Research

At a general level, the concept of research is fairly well understood, particularly in terms of dictionary definitions such as "systematic inquiry into a subject in order to discover or revise facts and theories." There is, as well, a fairly general understanding of the distinction between basic and applied research and, to a lesser extent, of the distinction between research and demonstration. When one attempts to apply these definitions and distinctions to the field of library and information science, however, the limitations of these definitions become apparent.

It is generally accepted that research implies use of the scientific method, defined as the "principles and procedures for the systematic pursuit of knowledge involving the recognition and formulation of a problem, the collection of data through observation and experiment, and the formulation and testing of hypotheses." Indeed, Jesse Shera's definition of research, given below, closely parallels this dictionary definition of the scientific method.

> Research is an intellectual process whereby a problem is perceived, divided into its constituent elements, and analyzed in the light of certain basic assumptions; valid and relevant data are collected; hypotheses (if any) are rejected, amended, or provided by objective testing. (Shera, 1964)

The ALA Office for Research distinguishes between research and other types of projects and clearly links research projects with scientific methodology:

> Research projects are those which pose a question, gather data through objective methodology, and analyze this data systematically so as to produce an answer to the question.
>
> Survey/statistics gathering projects involve collection of information (numeric or verbal) about libraries or librarians and reporting of results.
>
> Development/demonstration projects involve preparation of special materials or methods of doing things, active use of these materials or methods by institutions or groups, and reporting of results.

Note that there are two components to these definitions of research: the collection and analysis of data--the methodology component, and the formulation/revision/rejection of hypotheses/conclusions based on the analyses of those data--the purpose component. Research in library and information science has sometimes been criticized for failing to meet the standards of "scientific" inquiry in both of these areas. Shaughnessy (1976) claims that, if Shera's definition were used, "perhaps 80 to 90 percent of what is presently regarded as research would have to be discarded."

The most frequent criticisms focus on the first component. Several studies, including those by Van de Water et al., Schlacter and Thomison, and Grotzinger, have examined methodologies employed in library and information science research, with discouraging results. Van de Water et al. concluded that there is a "qualified tendency toward methodological improvement in research articles published in 1974, as compared to those appearing in the (1969-1971) period," while Schlacter and Thomison, as well as Grotzinger, saw no indication of increasing methodological sophistication. The article on "Library and Information Science Research" in the ALA World Encyclopedia of Library and Information Services states flatly that "Much of what has been called research in library and information science, however, has not been conducted using the scientific method, and often there is doubt about what has been learned."

There are those, such as H. Curtis Wright, who argue that librarianship and information are simply not amenable to scientific inquiry or intellectualization. This position deserves examination if only because it calls attention to the fact that library and information services, and user needs for and reactions to them, involve very "soft" data and, because human behavior is involved, they do not always lend themselves to the kind or level of experimentation and theory building common in the hard sciences. But as Kaplan, Shaughnessy, and others point out, experimental methodology is not the only, or necessarily the most important, aspect of research, and there are numerous methods that can be considered "scientific," including operations research, mathematical, analytical, historical, survey, experimental, modeling and simulation, and statistical methods (Kaske, Neal K. and James E. Rush).

Perhaps even more critical to the field are the alleged shortcomings in the second area: purpose. Numerous writers, including Busha, Shera (1968), and Wasserman, fault library and information science for failing to ask the right questions or to establish a theoretical foundation for further research and applications. Ennis charges that library research is "noncumulative, fragmentary, generally weak and relentlessly oriented to immediate practice."

For purposes of this project, we decided to use a fairly broad dictionary-type definition of research--one that would retain the central concept of "systematic investigation of a problem" but that was also broad enough to encompass many different approaches, from experimental and quantitative to conceptual and qualitative studies and methods. This definition could encompass both basic research--to achieve fuller understanding of phenomena, without consideration of how that understanding will subsequently be used--and applied research--to identify solutions to practical problems or to discover new knowledge that can readily be used in real-world situations.

C. OVERVIEW OF PROJECT DESIGN

This project was designed by OLLT to involve a number of professionals in the library and information science community, in addition to the Cuadra Associates project staff. The key element in the project design was a three-day meeting, in which already prepared research project descriptions were to be reviewed and evaluated by a number of distinguished researchers and practitioners, selected to represent a broad range of experience and expertise in the library and information science field. The meeting was to be preceded by a substantial amount of preparatory work, to help ensure that the meeting could achieve its objectives.

The project involved six major tasks:

(1) Review the literature and informally consult with other professionals in the field, to support the preparation of a background document that would help to guide the remaining project activities and to prepare participants for their role in the project

(2) With OLLT, identify and select project participants from both the researcher and practitioner communities

(3) Commission the 15 researchers to draft a set of project descriptions, to be reviewed by all 26 participants prior to the meeting and used as a stimulus for the formulation of the Research Agenda

(4) Prepare for and conduct a highly interactive, "results"-oriented, three-day meeting with project participants, to have them evaluate and prioritize the proposed projects and others generated during the course of the meeting, to define the Research Agenda projects

(5) Prepare a draft report, to present the Research Agenda and discuss its interpretation and potential use, for review by project participants and, in a special OLLT-sponsored Colloquium, by representatives of major library and information science associations and other organizations.

(6) Prepare a final project report and a summary report

A major ingredient in the project design, in addition to the three-day meeting, was the preparation of descriptions of research projects by the researcher participants, in advance of the meeting. The rationale for this approach--of evaluating and prioritizing possible research projects, rather than general problems, issues, or needs--was that doing so would help the participants, in the brief time they had together, to focus specifically on major problems, issues, and needs that lend themselves to research.

D. ORGANIZATION OF THIS REPORT

This report discusses both the process and substance of the study. This balance of reporting is important, because the context for reviewing and interpreting the projects included in the Research Agenda, as well as those that are not included, is represented in the process by which the Research Agenda was formulated. The report is organized into six chapters, a bibliography, and five appendices.

Chapter III provides an overview of methodology, including the preparation of a project framework, the selection of project participants, and the preparation and review of the proposed project descriptions. Chapter IV describes the Research Agenda meeting.

The results of the meeting--the Research Agenda--are presented and discussed in Chapter V. In Chapter VI, we discuss implications of this project and recommend ways in which the project and the Agenda can be used by the library and information science community. In presenting these ideas, we draw upon the views and perspectives offered by various representatives of the library and information sciences community who participated in the OLLT-sponsored Colloquium, in December, 1981.

In addition to these chapters, the report includes a Bibliography and List of References and five appendices. Appendix A presents an analysis of our literature review and Appendix B, a summary of informal contacts made with "gatekeepers." Appendix C contains the major findings from our review of both literature and data on patterns in research funding in library and information science areas. Appendix D contains full descriptions of the individual projects selected for the Research Agenda, and Appendix E contains summaries of the other proposed projects that were reviewed but not selected for inclusion in the Research Agenda.

III. REVIEW OF PROJECT METHODOLOGY

The key activity and centerpiece of this project was to be a three-day meeting, the purpose of which was to have a group of highly respected library and information science professionals (hereafter referred to as project participants) evaluate and prioritize research projects for inclusion in the Research Agenda. Considerable preparation was required during the seven months prior to meeting, both by the Cuadra Associates (CA) project staff and by the project participants. The major components of that work are described below. The meeting itself is described in Chapter IV.

In its Request for Proposal for this contract and in subsequent discussions with CA personnel, OLLT made clear its intention to have this project address the field of library and information science research in the broadest terms possible and without artificial or assumed limits based on perceptions of prior OLLT funding patterns. To help make this aim explicit to the participants and to provide a framework that could guide our project work, we prepared a set of draft background materials that:

(1) set forth the scope and boundaries of the project, focusing particularly on definitions of library and information science research

(2) provided a review of funding trends over the past decade

(3) identified a preliminary set of research categories that could be used to help guide the selection of project participants and the commissioning of draft research project descriptions

The materials produced in (1) above, since revised and condensed for inclusion in this report, were presented earlier in this report, in Chapter II. A summary of findings in (2) above is provided in Appendix C. The tasks that contributed to the development of these background materials and to (3) above--the identification of a set of research categories--are presented below.

A. DEVELOPMENT OF A PROJECT FRAMEWORK

To help ensure that, in the very brief time available, the scope and coverage of this project were defined on the basis of the broadest possible input, we studied selected literature and discussed major issues and trends with a number of library and information science professionals who were identified by OLLT, the CA project staff, or their own colleagues as "gatekeepers" in one or more areas of library and information science.

Literature Scan

To obtain a perspective on what professionals in our field have been writing about and researching, we collected and examined a broadly based subset of literature. This literature covered items in over 60 issues of 15 professional publications, as well as citations (and, as available, abstracts) from online searches of five databases.* All items were classified along a set of structured but open-ended dimensions (e.g., type of methodology; research environment and/or target populations) and we generated brief title annotations, to provide a record of the specific subject matter of each item.

A report on this analysis is presented in Appendix A, and a sample page is shown in Exhibit 1.

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*Online searches were conducted on: ERIC, Library and Information Science Abstracts, SSIE, Comprehensive Dissertation Index, and INSPEC. These searches focused on items indexed by research-related terms and library-and-information-service-related terms. The professional publications that were reviewed, cover to cover, included: Advances in Librarianship (1979, 1980); Annual Review of Information Science and Technology (1980); Bulletin of the American Society for Information Science (1979 and 1980 issues); Bulletin of the Medical Library Association (1980 issues); College & Research Libraries (1980 issues); Journal of Librarianship (1980 issues); Journal of the American Society for Information Science (1980 issues); Library Journal (10 1980 issues); Library Research (Spring, 1980-81); Library Resources & Technical Services (3 1980 issues); Library Trends (Summer 1980); Special Libraries (1980 issues); School Library Journal (1980 issues); The Library Quarterly (1980 issues); and Wilson Library Bulletin (1980 issues). In addition, Tables of Contents in the 1979 issues of many of these sources were reviewed for additional content areas.

Exhibit 1. Sample Page from Literature Analysis

ORGANIZATION OF INFORMATION (5)

Document Representation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Model classification principles (B)	(U.K.) Theory of integrative levels and relevance to design of classification schemes Use of titles for automatic document classification (Experiment)
LC subject headings: principles and applications (B) AACR2: problems, implications, description (N)(L)(F) Cataloging of the corporate entry: problem of relationship between corporate bodies—can automation (authority files) help? DDC19: problems; adoption (N)(L) Cataloging needs of public libraries (N) Serials cataloging (B) Problems in discography (F) Film cataloging (B)	Review of work about descriptive cataloging, 1979 (Literature Review) Review of works on subject analysis, 1979 (Literature Review) Performance of card catalogs—a review of research (Literature Review) AACR2: History and implications of implementation (Literature Review) Investigation of corporate headings with form subheadings and without subheadings (Dissertation) Relationship of the length of the catalog field to the accuracy with which it conveys the contents of the document it represents (Experiment) Handling of corporate authorship in descriptive cataloging (Dissertation) Analytical approach for studying corporate entry in cataloging (Dissertation) Survey of practices and expectations in name authority work on OCLC libraries (Dissertation) Adequacy of LCSH for Black literature resources Standards in structuring subject headings for art libraries (Experiment) Conversion from SEARS to LC (Experiment)
Indexing concepts and methods (B) Need for filing rules from a user's point of view (F) Indexing of legal books (F) Citation indexing applied to sciences, technology, and humanities (B)	Comparison of provenance and content indexing methods for subject retrieval in archives (Dissertation) Automatic indexing based on transition phenomena of word occurrences Test of the hypothesis that citation indexes work (Experiment)

A classification, shown in Exhibit 2, was developed to group the items listed as "Problems/Issues/Topics" and "Research." Although we examined over 1300 items, we do not consider the literature review to be exhaustive, nor do we believe that the display format used to report our review can be used to deduce "gaps" in research. The primary purpose of this background task was to obtain an idea of the areas that should be considered in shaping and defining a preliminary set of research categories.

Conversations with "Gatekeepers"

A total of 20 individuals considered to be among the "gatekeepers" in various areas were contacted to discuss problems and research needs. These individuals were selected to represent one or more of a number of different perspectives: librarianship, library applications research, and library education; school library media programs; information science; telecommunications and advanced technologies; public policy; and economics. We attempted to identify individuals who could represent one or more specific institutional settings and professional organizations. Practitioners, administrators, and researchers--including both public- and private-sector individuals--were included in this sample. Their comments are summarized in Appendix B.

In-Depth Review of Selected Articles

In the process of reviewing the literature, we identified a set of key articles that proved to be particularly useful in our development of background materials on definitions for library and information science research and on funding trends. These key references are presented in the BIBLIOGRAPHY AND LIST OF REFERENCES at the end of this report.

Identification and Analysis of Funding Data

To supplement our literature review on trends in funding for library and information science research, we contacted over 20 organizations identified by OLLT and the project team that were known, or thought to be, national-level research funding sources.

Exhibit 2. Framework Developed to Classify Items from the Literature Scan (Part 1)

CREATION OF INFORMATION

- Publishing
- Research/Knowledge (Library Profession)
- Research/Knowledge (Other Disciplines)

ORGANIZATION OF INFORMATION

- Management of
- Collection Development/Acquisitions/Selection
- Document Representation
- Automation
- Preservation/Conservation
- Other

DISSEMINATION OF INFORMATION

- Library Services (General)
- Targeted Library Services
- Roles of Libraries
- Inter-Library Loan (ILL)
- System Design and Evaluation
- Management and Evaluation
- Online Search Services in Libraries/Information Centers
- Other Automation
- Professional Communications

USE OF INFORMATION

- Users and Uses
- Use of Libraries and Information in Research
- Communication
- Library/Information-Use Instruction

MANAGEMENT OF LIBRARY & INFORMATION SERVICES

- Planning and Evaluation
- Administration
- Budgeting/Costs/Fees

NETWORKING AND COOPERATION/RESOURCE SHARING

- Role/Structure/Governance
- Multinetworking and Multi-Network Coordination

AUTOMATION AND TECHNOLOGY

- Microforms
- Automation
- Technologies

Exhibit 2. Framework Developed to Classify Items from the Literature Scan (Part 2)

PROFESSIONALISM

- The Profession and the Discipline
- Professionals
- Careers and Career Development
- Societies/Professional Associations

EDUCATION & TRAINING

- General
- Academic Programs
- Continuing Education

PUBLIC POLICY/INFORMATION POLICY

- Access to Information
- Information Policies
- Funding of Library Services

GOVERNMENT: PROGRAMS & SERVICES

STANDARDS

COPYRIGHT

CENSORSHIP/INTELLECTUAL FREEDOM

THEFT

FUTURES

Through these preliminary contacts, we were able to classify the organizations according to their role in funding research, the results of which are shown below in Exhibit 3. Sufficiently detailed funding data could be obtained from nine of these 12 funding sources (indicated with asterisks in Exhibit 3) for use in our analysis.

Exhibit 3. Illustrative List of Funding and Potential Funding Sources

SOURCES OF SUPPORT FOR LIBRARY AND INFORMATION SCIENCE RESEARCH

Andrew W. Mellon Foundation
*Carnegie Corporation of New York
Charles A. Dana Foundation
*Council on Library Resources
*Department of Education/National Institute of Education
*Department of Education/Office of Libraries and Learning Technology
Exxon Educational Foundation
Fund for the Improvement of Postsecondary Education
*National Commission on Libraries and Information Science
*National Endowment for the Humanities
*National Library of Medicine/Extramural Grants Program
*National Library Service for the Blind & Physically Handicapped, Library of Congress
*National Science Foundation, Division of Information and Technology
Special Libraries Association

SOURCES OF GENERAL SUPPORT THAT DO NOT NOW FUND RESEARCH (OR EXTERNAL RESEARCH)

Association of Research Libraries
Department of Education/Library Education and Secondary Resources Branch
Department of Education/Library Services and Construction Act
Department of Education/National Center for Educational Statistics
Department of Education/School Media Resources Branch
Library of Congress
National Archives
National Library of Medicine/Lister Hill National Center for Biomedical Communications

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*Included in subject and funding analyses, reported in Exhibit 4 and Appendix C.

We identified, in total, over 600 projects relevant to library and information science that were funded by these nine organizations during the period 1970 through 1980. A broad definition of research was used, in terms of both methodology and areas of inquiry. For example, we included some demonstration projects, as well as "desk" projects related to the theoretical basis of information science. Projects excluded were those involving general library support grants, support for the organization of, or attendance at, meetings, and support for collection development or other activities such as the American National Standards Institute.

These 600 projects were classified into 32 areas of inquiry, using the classification scheme developed from the literature scan and shown earlier in Exhibit 2. Research areas that received the largest amounts of funding, i.e., a total of over $2 million during the period of this analysis, involved these subjects: the generation of information in various disciplines; computer system design and evaluation; the management of library and information services; document representation; and user studies. The detailed analysis, showing for each area of inquiry the number of different funding sources and level of funding, is reported in Exhibit 4. Further background information on patterns in funding of library and information science research is presented in Appendix C.

Preparation of Preliminary Research Categories

On the basis of a review and discussion of background materials described in the preceding sections, the project team developed a set of preliminary research categories, to help guide the participating researchers in selecting areas for their research project descriptions. These categories are summarized in Exhibit 5. A difficult judgment to make in conceptualizing research categories was on the most appropriate level of specificity. The categories could not be so broad (e.g., "networks" or "automation") that the specific intent or focus of concern was lost. On the other hand, the categories could not be so specific as to make them actual research projects. This dilemma was resolved by taking an approach that used both generic classes and a number of important (and illustrative) subclasses.

Exhibit 4. Areas of Inquiry: Analysis of Research Awards in the 1970s (Part 1)

AREAS OF INQUIRY	No. of Projects	No. of Funding Sources	Total Funding
Information retrieval system design and evaluation	103	5	12090K
Management of library and information services and systems	54	13	6433K
Networking and resource sharing	55	7	5534K
Information generation: research in disciplines other than library and information science	37	3	4341K
Users and uses of information	36	4	3764K
Information generation: research in library and information science	32	4	2990K
Library automation	16	8	2352K
Publishing	33	5	2252K
Cataloging, classification, indexing of materials, and other means of document representation	28	7	2140K
Use of libraries or information in research	37	4	2039K
Library collections/acquisitions/selection	16	6	1732K
Targeted library services	8	3	1686K
Online search services in libraries and information centers	10	3	1333K
Preservation and conservation of materials	14	3	1178K
General library services	15	1	1165K
Technologies	5	4	730K
Continuing education for librarians and information professionals	13	3	721K

Exhibit 4. Areas of Inquiry: Analysis of Research Awards in the 1970s (Part 2)

AREAS OF INQUIRY	No. of Projects	No. of Funding Sources	Total Funding
Costs/budgeting/fees in library and information services	13	4	697K
Library or information use instruction	8	3	388K
Library and information professionals	6	3	316K
Standards	5	3	307K
Futures	4	1	276K
Academic programs for library and information science education	7	2	271K
Information policy	4	2	269K
Microforms	9	3	254K
Copyright	3	2	250K
Education and training (general)	3	1	202K
Interlibrary loan	3	2	123K
Role of libraries in the dissemination of information	4	2	121K
Library funding	3	1	94K
Government programs and services	1	1	14K
Theft	1	1	9K

Exhibit 5. Preliminary Research Categories (Part 1)

A. USERS AND USER NEEDS

1. Ways in which individuals learn about basic concepts of information, information sources, and information use

2. Information-seeking and information-using behaviors, with consideration of the various types and sources of information and methods for determining what users need

3. Impact of received information on the immediate recipient and the ultimate (end) user of the information

B. MANAGEMENT AND EVALUATION OF LIBRARY AND INFORMATION SERVICES

4. Management concepts and tools (or models)--including management of multi-site libraries and networks--e.g., for managing resources, for identifying true costs and cost-accounting procedures, for estimating user demand and information supply, and for defining jobs/supervising personnel

5. Techniques for, and effects of, the "marketing" of library and information services

6. Determining (including measurement approaches) and assuring quality of library and information services

C. NEW ECONOMICS OF LIBRARY AND INFORMATION SERVICES

7. Elements of cost in all areas of the production and dissemination of information, and the placement of appropriate values on information packages and services

8. Alternative funding possibilities for publicly supported library and information services

9. Economic implications, particularly for the small library and information service organization, of electronic publishing and distribution

D. NEW AND EXPANDED LIBRARY AND INFORMATION SERVICES

10. Feasibility and potential impact of various new types of services, e.g., home-information delivery services, information and referral, and other community-related services

11. Implications of an access orientation (as opposed to a "holdings" orientation) on collection development, inter-library loan, document delivery, copyright, networks, standards, etc.

Exhibit 5. Preliminary Research Categories (Part 2)

E. SYSTEM DEVELOPMENT

12. Technical interface-related considerations for improved access to systems, by intermediaries and end users

13. Social, cultural, and psychological considerations involved in promoting and educating for public use of systems

14. Feasibility and design considerations for systems to support reference services (e.g., fact-providing and question-answering services)

15. Descriptive cataloging and indexing needs for online systems to be used by end users

16. Preservation and protection of various non-print storage media

F. FACILITATION OF CHANGE IN THE PROFESSION

17. Professional communication, in getting research to researchers and getting research (or translations of research) to practitioners

18. Adoption of innovation by library and information service institutions (how new tools and practices are adopted/integrated) and methods for facilitating adoption in the future

19. Identification and assessment of research methodologies and tools--including theories within and outside the library and information science field--available to library and information researchers and to practitioners

20. Education and continuing education requirements for the professional of today and tomorrow

G. ROLE OF INFORMATION IN SOCIETY

21. Relationship of information use to productivity

22. Potential of information principles and technologies in the solution of problems in human services, government, science, technology and business

23. Integration of information into the instructional and learning processes

The categories in Exhibit 5 reflect several basic perceptions held by the project staff about the most desirable type of candidate projects to be developed for the Research Agenda. It was felt:

- That the projects should cover areas in which the resulting research could achieve high visibility and impact. Although there was a need to be fairly broad in defining potential research areas, the intent was not to be exhaustive. As requested by OLLT, the framework of research categories was, in itself, intended to be a first-level screening of priorities.

- That, to the extent possible, the projects should be expressed in institution-independent terms. They should reflect needs and problem areas that are shared across a wide spectrum of library and information service organizations and across a wide spectrum of library and information service professionals. A number of gatekeepers volunteered the opinion--one that we share--that our field has been too fragmented and that we must pay greater attention to commonalities, particularly if we are to maximize the effects of research expenditures from federal and other national-level funding sources.

- That there is a need to break new ground in research, particularly in areas where funding support has not been strong. This does not mean that we have answered all questions in other areas for all time. In some fundamental areas (e.g., planning, measurement, and evaluation), research is still needed, even though the areas have had substantial attention. A balance needs to be achieved between identifying creative new ways of sharing and disseminating information, and making use of the already existing knowledge base. knowledge base.

- That the research categories should not deal solely with internal processes of providing library and information service but must also address some of the areas in which library and information services interface with and affect other aspects of our society.

- That the trend toward electronic distribution of information will continue, and computer and microprocessing technologies will become more pervasive in education and in our everyday and business lives. This view of the future will need to become one of the central reference points in the structure and definition of goals in our profession, in library and information science education, and in the economics and provision of library and information services.

Although it would have been convenient to think about major research categories only in terms of traditional functions and classes like the ones displayed earlier in Exhibit 2, we elected not to do so. We hoped that the presence of some non-traditional classes would help free the project participants to explore some of the more global and multidimensional problems facing our field. The drawback of this approach, of course, is that, at first glance, some major areas may appear to be "missing." For example, "cooperation and resource sharing" and "technology," both important and popular topics, are not explicitly named as research categories. The fact that no specific categories have been devoted to them does not mean that they were not addressed. We expected the participants to address these and any other specific issues that they considered important as they interpreted the preliminary categories from their own perspectives.

In guidance given to researchers for preparation of the research project descriptions, we emphasized that these areas and categories were not intended to limit or constrain them in developing ideas for proposed projects. We told all of the participants that they would have an opportunity to propose additional problem areas and needs at the Airlie House meeting itself.

B. SELECTION OF PROJECT PARTICIPANTS

To meet the stated objectives of the Research Agenda project and to stay within the resources available for this project, we established, with concurrence from OLLT, a maximum number of professionals to be invited as participants in this project. The final set of participants, all of whom were identified with their present affiliations in the Acknowledgements, included 15 researchers (14 of whom participated in the meeting) and 11 practitioners.

Invitational meetings almost always raise questions about the criteria for invitation and about the representativeness of the invited group. Final selection of the participants was made in cooperation with OLLT, on the basis of a number of criteria. Besides being leaders in their respective areas, the participants, collectively, represented a very broad range of backgrounds and expertise--a major consideration in our selection, along with the goal of achieving various kinds of geographic, affiliation, and occupational balance.

The selection process began with the identification of a set of candidates, drawn from recommendations made by OLLT, the Gatekeepers with whom we discussed major research area needs, and our own staff. From this "starter" set of candidates, we made a number of contacts, to get first-hand information on their current primary areas of specialization, and to determine their interest in being participants in this project. During these conversations, we also obtained their recommendations for additional names of qualified individuals. Followup contacts were made with these additional individuals, as well. Over 40 individuals were contacted, to learn of their possible interest in participating, and each of these candidates was matched against the major research areas in our preliminary set of categories, to help ensure that we were adequately covering the types of expertise needed to prepare research project descriptions in all areas. (All participants submitted vitae to help us in this matchup process.) Various matrices were made to help achieve the desired types of balances and, with the advice and assistance of OLLT, a final selection was made.

C. PREPARATION AND PRELIMINARY REVIEW OF PROPOSED RESEARCH PROJECTS

Each of the 15 researchers among the 26 project participants was asked to prepare, in draft form, descriptions of approximately six research projects. Although their interest areas had been discussed in the course of inviting their participation, we formalized the commissioning of these descriptions. Each researcher was asked to specify from among the set of 23 research categories (see Exhibit 5) those that were of primary and secondary interest. In addition, each researcher was invited to suggest additional research areas that he or she wished to address in the research descriptions. All of these preferences were arrayed in a matrix and reviewed by CA staff. On the basis of the "fit" between researcher interests and the areas identified in the matrix, we made tentative assignments for each researcher. These assignments were discussed with each researcher over the telephone and mutually agreed on as the areas in which they would focus their attention.

The purpose in making these assignments was to help ensure that we covered all of the major research areas and that we minimized unintentional duplication. (Some overlap was intentionally built into the assignments, to help ensure coverage of selected broad areas). Our understanding with the researchers was that they were free to shift their focus, if certain areas did not develop well for them, and to group projects together, if necessary, to provide the right kind of coverage of problem areas.

With these assignments, we provided instructions on the format and content to be provided for each project description. Each contribution was to be approximately five pages in length and include these sections:

> Background. To describe briefly the major problem area(s) that the project addresses, including citations to previous relevant research on which the proposed study should build.
>
> Purpose and Objectives. To discuss research questions and hypotheses to be studied and to identify the intended beneficiaries or target populations.
>
> Study Approach. To characterize the type of methodology (e.g., experiment or survey) being proposed and to indicate the particular environment in which the study is to be conducted.
>
> Cost Estimate. To include the number of professional person-years and any additional extraordinary direct expenses.

Researchers were given approximately two months to prepare draft descriptions of proposed research projects. Although they were asked to build on already existing or ongoing research, we did not expect, in the time allowed, for them to prepare in-depth state-of-the-art papers or to justify in detail their selection of particular problem areas or research approaches. In other words, we did not require "polished" proposals. As mentioned earlier in this report, the purpose of developing these project descriptions was to have available at the Airlie House meeting the type of stimulus material that would help the participants to focus their discussions and evaluations on specific, concrete ideas for dealing with important problem areas and needs.

After the drafts were received, they were distributed to OLLT and to all participants, for review and initial evaluation and rating prior to the meeting.

IV. SUMMARY REPORT OF THE RESEARCH AGENDA MEETING

The Research Agenda meeting with 25 participants was held in a retreat environment at Airlie House, in Warrenton, Virginia, July 19-22, 1981. The sequence of sessions, which included small-group workshops and plenary sessions, is shown in Exhibit 6. The overall meeting plan was designed to facilitate discussion and evaluation of the research ideas and, ultimately, the selection of the top 20 (or so) projects that would comprise the Research Agenda. It was also designed to provide the opportunity for the participants to share and discuss the criteria on which they based their judgments.

The 88 projects that had been prepared in advance by the researcher participants were grouped into three sets--A, B, and C--in an initial classification system designed to facilitate discussion and evaluation of projects on similar topics. Participants were given complete latitude to combine projects (e.g., to strengthen any individual projects or to broaden the scope of a single project) and/or to develop entirely new project descriptions, in order to cover research areas that had not been covered adequately in the set of 88 projects. As a result, 101 projects and combinations of projects were reviewed by the participants. Full copies of the top-ranked projects--the Research Agenda--and summaries of all other projects are given in Appendix D and Appendix E, respectively.

In the following sections we report on the major segments and processes of the meeting. The CA project director served as chairman of the meeting. He and two other CA senior staff members chaired small-group workshops and acted as facilitators but did not take part in any voting.

A. INTRODUCTORY SESSION

Following introductions of all participants, Dick Hays, the Deputy Assistant Secretary, Office of Libraries and Learning Technologies, presented an overview of OLLT's goals and expectations for this project. Some of the participants had assumed that, because this study was being supported by

Exhibit 6. Summary of Research Agenda Meeting Schedule

DAY 1

2 hours	INTRODUCTORY SESSION

DAY 2

2 hours	WORKSHOP AND PLENARY SESSIONS: Project Evaluation Criteria
6 hours	WORKSHOP AND PLENARY SESSIONS: Evaluation and Rating of Projects in Groups A and B

Day 3

2 hours	PLENARY SESSION: Evaluation and Rating of Projects in Group C
1 hour	PLENARY SESSION: Review and Revision of Evaluations/Ratings of Group B Projects
1 hour	PLENARY SESSION: Review and Revision of Evaluations/Ratings of Group A Projects
2-1/2 hours	INDIVIDUAL AND SMALL-GROUP WORK SESSIONS: Preparation of New, Revised, and Combined Projects
1 hour	PLENARY SESSION: Discussion of New, Revised, and Combined Projects

(INDIVIDUAL TIME: Rating of Final Candidate List of 42 Projects)

Day 4

3 hours	PLENARY SESSION: Presentation of Final Ratings and Review/Discussion of Research Agenda Projects
2 hours	PLENARY SESSION: Evaluation of Meeting and Final Product Dissemination

OLLT, the research projects should be relevant to OLLT's mission and domain, as they understood it. They were reminded that the Research Agenda was to have no such preconceived boundaries or limitations.

Orientation Comments

Following a presentation of the procedures to be used for rating the research projects, the Chairman introduced several basic premises to guide the process of evaluating projects. He noted that a group of very diverse individuals had deliberately been selected for this meeting and that we did not want to lose the potential value of that diversity in the process of evaluation. What was important in the process was that individual perspectives and value systems be communicated to other participants. We had no requirement for, or expectation of, achieving consensus, in the sense of complete agreement. The selection of Research Agenda projects--the "top 20" projects--would be determined through the averaging of individual ratings.

We also fully expected that each participant would apply his or her own set of criteria to the evaluation process and, again, what was important in the discussions was for these criteria to be made explicit. In planning the meeting, we had considered and rejected the idea of establishing a specific set of criteria in advance and asking the participants to use them, even though using them would have imposed somewhat greater structure on the overall process. Instead, we planned to have the group members share their ideas about the most important criteria. A set of criteria, shown in Exhibit 7, was presented and reviewed, to stimulate the group's thinking about the criteria to be considered. (Full discussion of this topic was scheduled for the first session on the following day.) However, participants were told that they would be asked to apply their own weighting of criteria, using their personal "multiple-correlation machines."

Report on Pre-Meeting Ratings

In the weeks prior to the meeting, participants had been asked to review and provide ratings on the original set of 88 projects. This pre-meeting evaluation had been requested to ensure that the participants had time to study the

Exhibit 7. Suggested Criteria for Participants' Consideration

- Importance of project to the field of library and information science
- Importance to the users/clients/beneficiaries/publics that are served by library and information services
- Technical soundness of the research concept/plan
- The extent to which the problem/issue/target is truly amenable to research
- The area of subject matter, including the problem or need it addresses and including whether the project description is framed either too broadly or too narrowly
- The objective of the research (what is to be learned) and the preciseness with which the objective has been described
- The reasonableness of the project's view of the present state of affairs and consistency with the participants' own visions of the future
- Awareness of and linkage with prior research in that area
- The cost-benefit ratio (likely impacts for the resources utilized)
- The number and type of potential beneficiaries
- The likelihood that the results can be put to immediate, practical use
- The extent to which the problem or area has been studied before or opens up new ground
- The size of the project, in terms of funds required, extensiveness in effort, need for massive cooperation, etc.
- Extent to which the project is premature, i.e., assumes data, methodology, or an environment that does not yet exist
- Helps to achieve a balance among projects

projects carefully, because there would be only limited time at the meeting for reading and reflection. It was also important to determine whether we were likely to encounter serious problems in the use of a 5-point rating scale. At the meeting, we reported that, in examining the returns, we found no evidence of such problems, and the preliminary evaluations supplied ample evidence of the diversity of views represented in the group. Summary statistics for these preliminary ratings are provided in Exhibit 8. Almost all of the projects had attracted all five points on the rating scale: 67 projects (out of 81*) had 1s (the "high" end of the scale) and 2s and 3s and 4s and 5s. No project rated better than 1.9 (an overall rating average) and no project rated lower than 3.9.

B. THE WORKSHOP/PLENARY SESSIONS ON CRITERIA

In their first small-group workshops and in the first plenary session, participants were asked to share their views with each other on the criteria that they had applied in their pre-meeting evaluations and on the criteria that they thought should be applied during the course of the meeting. To stimulate discussions in the small-group workshops, participants were asked the questions given below, which were to be answered independent of any specific projects, unless they were needed to illustrate a particular criterion.

- What made your 1-rated projects 1s?
- What kept your 2s from being 1s?
- Did your 3s, 4s, and 5s simply lack something that the others had, or did they have a specific characteristic whose presence caused a lower rating?

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*A final set of seven project descriptions was not available in time to be included in the pre-meeting evaluations, although they were distributed prior to the meeting.

Exhibit 8. Summary Statistics for the Pre-Meeting Evaluation Ratings

1. Distribution of Raw Tallies, by Rating Score

Rating Score	Number of Times Assigned
1	371
2	432
3	372
4	309
5	246

2. Distribution of Ratings, by Number of Projects

Distribution of Ratings	Number of Projects
1 - 2 - 3 - 4 - 5	67
1 - 2 - 3 - 4 - #	8
# - 2 - 3 - 4 - 5	3
1 - 2 - 3 - # - 5	2
1 - 2 - # - 4 - 5	1
	81

3. Average Rating Scores

Range of Average Scores	Number of Projects
1.8 or Higher	0
1.9 - 2.0	5
2.1 - 2.5	22
2.6 - 3.0	29
3.1 - 3.5	21
3.6 - 3.9	4
4.0 or Lower	0
	81

Group 1 recommended that the projects to be selected have broad societal implications, be future-oriented (i.e., not bound by the present), and be cost-beneficial. Group 2 recommended focusing first on research issues and the problems being addressed and, in a later pass, use the methodology to help ensure that the problem is truly "researchable." They recommended using a "so what" test to decide whether the project would make a significant difference and they proposed trying to achieve some balance and breadth, "thinking eclectic." The third group identified four major criteria: the strength of the theoretical base; methodological plausibility; due consideration of the state of the art; and potential payoff.

The discussions in the small-group workshops that generated these recommendations and that ensued in the followup plenary session illustrate some of the contrasting perspectives that were held by participants. Views in several areas are summarized below.

Funding

Several participants noted that they expected to change their pre-meeting views on the projects because of the broader funding scope that had been emphasized in the previous evening's discussion. For at least one participant, whether a project was a fundable represented major factor in the ratings:*

> A question I asked myself (in rating projects) was: is there some agency that will fund this project? I think that some political astuteness is called for.

Other participants ignored funding:

> I did just the opposite: I looked at projects without regard to funding or funding sources.
>
> I believe that if you feel intensely enough about something, you can probably get funding for it.

---

*Quotations provided throughout this report are not necessarily verbatim. Most have been condensed and edited for purposes of readability and clarity.

Relevance to Library and Information Science

Discussions in both the small groups and plenary sessions showed that the relevance of a project to the domain of library and information science research was considered by many participants, even though they had different views on its importance as a criterion:

> Some projects were beyond our domain, but then I said to myself: Why shouldn't we be the ones to raise these questions? (The example given had to do with the economic theory of information.)
>
> I liked projects that led us into other fields.
>
> This area bothers me....literacy is a problem that the field of education hasn't been able to solve, and we can't really solve it either. It's beyond our scope.
>
> We in the public libraries have always been a local option; we are not mandated. So, projects that let us show value to political decisionmakers are most important--that's real life. I rated library technology, funding, and literacy projects highest.

This criterion assumed greater significance in the course of the meeting, particularly as views on the boundaries of library and information science as a field of research study were constantly being tested.

Project Objectives and Methodologies

The difficulty in evaluating research projects, as opposed to research areas, was revealed most dramatically in discussions of projects in which the research objectives (or the problem areas being researched) were significantly more, or significantly less, compelling than their proposed methodology. This dilemma faced by the participants is reflected in these comments:

> I feel we should be dealing with issues, not projects. That's why I rated basically on objectives rather than on methodologies.

> I didn't worry so much about methodology but looked at the problem being addressed.
>
> But, are we going to be stuck with projects that have bad methodologies?

This dilemma was not resolved in the general discussion of criteria, although one of the groups, as mentioned earlier, suggested that methodologies become a concern for a second pass. In fact, it appears that, in their evaluations, the participants tended throughout the meeting to focus primarily on research objectives, but they made methodology the direct focus of attention on those projects where the methodology was particularly weak and/or where the methodology was a major component of the research objectives (e.g., where a methodology was being tested for its usefulness in addressing a particular problem). In general, however, research objectives were far more important to the participants than methodology.

It should also be noted that there are many projects in the collection, even among those that were finally included in the Research Agenda, that members in the group would have liked to work on, time permitting, to improve the objectives, the methodology, or both. They recognized, however, that creating descriptions of "polished," ready-to-fund projects was not a major goal.

Present Versus Future Orientation

Officially, the scope of the meeting's concern was the "1980s." This point was emphasized a number of times, to ensure that participants did not take too narrow a view of the time frame for the proposed research. The participants differed in the extent to which they could--or wanted to--detach their project evaluations from present-day concerns. Strong opinions were voiced, by both researchers and practitioners, about the extent to which one needed to bring an orientation toward the future to the evaluation process.

We can't really deal with areas in the distant future.

(Question to researchers) Are your projects extensions of present projects or new areas? (Answer, from several researchers) Mostly extensions.

We cannot and should not fail to look at historical studies and present studies to see where we are.

I rated novel ideas higher.

(In answer to a question about projects relating to the present, e.g., use of the card catalog) How to build a better buggy whip--such as the card catalog--is not the type of project we should be interested in.

Projects with broad impact and futures orientation tend to have less well-developed methodologies, but we can try to improve these methodologies or take it on faith that someone will learn how to study a problem.

Scope, Size, and Impact

A number of contrasting views were presented regarding the rightful place on a national-level agenda of relatively small (low-effort) projects and projects that were narrowly focused.

In response to questions on the meaning of "broad societal implications" (a criterion recommended by one group), the point was made that application of this criterion could help to weed the substantive from the trivial and to focus more attention on those projects that would have impact on a greater part of society. Another group expressed the same general idea, calling the criterion the "so-what?" test.

One practitioner translated the scope, size, and impact issues into this set of criteria: the projects must have some relevance in the world, have a macro-level view, and must have some potential for ultimate impact on end users and on the ability of the library to thrive, compete, and survive. Only projects of this type should be considered of "national" importance.

Balance

A theme throughout much of the discussion was the need for "balance," not as the characteristic of a single project but as a criterion for judging the "mix" of projects selected for the research agenda. This theme was first expressed in terms of an eclectic or heterogeneous approach:

> There are several models for a research agenda: an Apollo-type agenda, representing what was needed to accomplish that single mission; a "fusion"-type agenda, where one of a few types of energy solutions must be selected; or the "cancer" research program model, in which a multiplicity of solutions must be researched. For our field, a heterogeneous approach has been most typical.

The concept of balance was later expressed nicely in terms of the Research Agenda's serving as a "research portfolio." During the discussion on this concept, another "meta-project" concern was expressed in these terms:

> A major objective for the agenda should be to create a better climate for research. You can have a program-oriented research approach that consists mainly of RFP-type bidding, or you can have less defined areas and stimulate researchers to develop their own ideas. Some research builds research capacity among professionals and is therefore worthwhile, even if it is not the most important research project in itself.

The participants did not arrive at a clear consensus on the specifics of the balance that was to be achieved among the projects, but it was clear that the achievement of some kind of balance in the areas or topics to be discussed was to be an important consideration in their selection of projects for the Research Agenda.

A rather surprising aspect of the discussion on criteria and expectations was the total absence of strong and sharply stated special-interest views that tend to become divisive in many meetings. The participants were able to respond to the challenge to don their "library and information science professional" hats and look at the full spectrum of concerns and issues in the field, regardless of whether those concerns and issues were of primary concern in their day-to-day professional work.

C. THE PROJECT EVALUATION AND RATING SESSIONS*

The various discussion sessions were intended to achieve the following objectives:

- To give the participants an opportunity to review their pre-meeting evaluations, in the light of the discussions on applicable criteria, and to change those ratings prior to our computing the scores and averages for each set of projects
- To display the individual group ratings and overall ratings for the projects, as stimuli for discussion
- To encourage discussion of why the top-rated projects that received a statistically high rating (i.e., a low score) should or should not make the "preliminary cut" of projects to be considered as candidates for the Research Agenda
- To determine whether there were other projects that received poorer ratings from the group but for some reason deserved to be "upgraded" for inclusion in the preliminary cut
- To identify projects that should be combined and/or improved
- To identify areas in which new projects should be generated
- To arrive at a set of top projects to be included in the preliminary cut

The discussions held throughout the two days also resulted in a number of changes to the statistically derived list of candidate projects. Projects were "downgraded"--removed from the list--or "upgraded"--added to the list--on the basis of discussion among the participants. In addition, new and combined project descriptions were prepared. A flavor of some of the discussions that led to changes in the statistically derived listing is provided in the examples given below.

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*Project numbers are provided in this section to help readers locate descriptions presented in Appendices D and E.

Recomendations for Combining Projects

Projects 33 and 11 on public library funding were both among the top-rated projects from their group, which led to the following interaction about the need to combine the two, as well as Project 51, which had not been a top-rated project.

> Because we're so concerned with the issue of public library funding, we're applying different standards to the projects. I can't see how these projects were trying to reach the goal of financial stability for libraries, or even what the problem statement is, or whether it's researchable. Project 51 came closest to being a real research project with a specific methodology. What is the specific question that Project 33 addresses, and what answers will it provide?
>
> Project 33 says that a group of 25 to 50 people will get together and come to a consensus on what should be done. You know what it's like when you get 25 or so people together and try to come to a consensus...clearly the area is important, but research cannot produce the answer.
>
> Regarding Project 51: most people recognize that the property tax is not a viable funding mechanism for public libraries. NCLIS did work on alternative funding sources and published this work some time ago. We should build on that work.
>
> It's O.K. for us to say that there are broad approaches to research in an area and that, within that, there are also more specific approaches. Funding agencies can fund one or both of these approaches, but I hope that we're not saying (if we combine them) that one study in this area should be funded in the next eight years.
>
> However important an issue is, you have to come up with a research project or else the issue must pass. Is it researchable? If not, we have to drop it.

As a result of this interaction, two of the project authors and a practitioner volunteered to work on a combination of the three projects--which became Project 95--although the group also voted to leave the two individual projects in the list, for final rating later.

Recommendations for" Upgrading" and "Downgrading" Projects

Several projects that were not in the top ten of their groups ("A," "B," or "C") were reintroduced by individuals for possible upgrading and inclusion in the preliminary cut. For example, projects 38 and 46 were introduced as two networking-related projects, although they had quite different foci: project 38 covered collection development and project 46 covered school library media programs in networks. In the case of project 38, a practitioner noted that it was rated low because the problem of cooperative collection development in networks was not one of lack of methods or concepts, but lack of commitment. This person was not sure that those problems could be addressed through research. Another practitioner felt that much was already being done in practice to bring school library media programs into networks. Neither of these two projects was upgraded by the group.

Project 30, on general economic theory, was one of several projects that stirred more controversy than others. In one of the initial evaluations, this project received seven 1s and also seven 5s. For some participants it was a very important area; for others, it was outside the scope of library and information science. In representing the opinion of those on the latter side of the issue, one participant noted: "We should concern ourselves first with studying our own micro-level economic issues." In spite of such reservations, the group voted to include the project in its preliminary cut.

The reasons for downgrading projects were not always made explicit. One project on electronic catalogs was downgraded because some members felt that the project overlapped previous research and that the new project did not add sufficiently to that earlier work. Whether the proposed new project was in fact linked conceptually to previous reseach was not resolved. The discussion focused instead on why research sometimes goes unheeded and/or unknown. Some of the participants felt that certain types of research, including alternative methods for generating cataloging data for online use, are a threat to the library establishment and can go no further.

D. FINAL SELECTION OF AGENDA PROJECTS

In a final evaluation session, participants were asked to rate all of the projects that had made the preliminary cut. There were 42 such projects, out of a total of 101 candidates. The ratings were tallied during the evening and early morning hours and the results were presented to the participants on the final morning of the meeting.

In reviewing these final rating results, the group agreed to stay with the objective of making the top-rated 20 projects the Research Agenda. However, it is important to note that there were few natural breaks in the point distribution, and the cutoff at 20 was based simply on a predetermined target.

Because some projects were, in fact, combinations of individual projects that were also being rated individually, the group voted, on a case-by-case basis, whether to retain in the Research Agenda either a "combined project" or the "individual projects" comprising that combined project. In general, their preference was to retain individual projects in cases where they had received more favorable rating scores.

The Research Agenda projects are presented and discussed in the following chapter of this report.

V. PRESENTATION OF THE RESEARCH AGENDA

In advance of the Airlie House meeting, we set as a target approximately 20 projects to be included in the Research Agenda. This target was not intended to be strictly adhered to and, in fact, through combinations of projects--representing project areas--more than 20 specific projects are included in the final Research Agenda. The rationale for establishing a target was to help ensure that, however difficult it was to make hard choices and establish priorities, it would be done.

In this chapter, we present and discuss the Research Agenda projects and place them in the context of the "universe" of projects and areas that were considered at the Airlie House meeting.

A. OVERVIEW OF THE RESEARCH AGENDA

Exhibit 9 shows, by number and title, the final set of projects and combinations of projects selected for inclusion in the Research Agenda. In selecting these projects, the participants very clearly did not intend to convey the message that the research area represented by one project was necessarily more important than the area represented by another project. Therefore, we have displayed the final set of projects in a classification scheme, to help characterize the major focus of each project or set of projects. The sequence of presentation in this Exhibit does not imply the relative importance of various areas. Complete project descriptions are provided in Appendix D.

The scope of the Research Agenda, within the total universe of projects and areas considered at the Airlie House meeting, is illustrated in the display given in Exhibit 10. This display shows the Research Agenda projects (indicated with circled project numbers) in relation to the total number of candidate projects in each category.

Exhibit 9. Research Agenda Projects, by Number and Title (Part 1)

INFORMATION GENERATION AND PROVISION OF LIBRARY AND INFORMATION SERVICES

Electronic Generation, Storage, and Delivery of Information

03. Exploiting the True Capabilities of Electronic Publication

100. The Role of Libraries in Creating and Providing Viewtext Information Services (combining projects 79 and 80)

    79. Role of the Community Library as Viewtext Information Provider

    80. Impact of Viewtext Systems on Traditional Reference Functions of the Community Library

Use of Automation in "Reference-Desk" Services

04. An Online Network to Support Question Answering in Libraries

54. Information Transfer at an Online Reference Desk in a Public Library Setting--Design Considerations for Staff and Patron

INFORMATION USERS AND USES

Information Needs

09. Techniques for Marketing Library and Information Services

37. Consumer Behavior Research Applied to Libraries

64. From Childhood to Adolescence; Changing Information Needs

Information-Seeking Behaviors

55. Direct and Quick Information Retrieval Service in a School Setting

58. Information Seeking in High and Low Scatter Fields

Information Access and Use

18. Development of a Conceptual Framework for Observation of User Behavior with Online Information/Data Systems

19. The Influence of Selected Information Search Mechanisms on User Behavior

21. Evaluation of the Changing Needs of Online Search System Users as Influenced by Search Systems Experience

78. Impact of the "New Literacy" on the "Knowledge Gap" Between Demographic Groups

Exhibit 9. Research Agenda Projects, by Number and Title (Part 2)

ECONOMICS OF INFORMATION AND OF LIBRARY AND INFORMATION SERVICES

Costs of Library and Information Services

94. Costs and Cost Analysis of Library and Information Services (combining aspects of projects 17, 82, and 36)

    17. Elements of Cost in the Production and Dissemination of Information

    82. Cost-Accounting Standards

    36. Development of Cost and Performance Models for Evaluating Library Automation Programs

Funding of Publicly Suppported Library and Information Services

11. Alternative Funding Possibilities for Publicly Supported Library and Information Services

The Economic Value of Information and of Library and Information Services

31. Impact of Information on Industrial Productivity

32. Impact of Public Libraries on Community Productivity

84. Economic Value of Investment in Information

EDUCATION AND PROFESSIONAL ISSUES

97. Dissemination and Diffusion of Library and Information Science Research and Practice (combining projects 98, 42, 26, and 23)

    98. Analysis of Effective Researcher-Practitioner Linkages in the Library/Information Field

    42. Diffusion of Innovation in Librarianship

    26. "Pathfinders": The Diffusion of an Information Innovation

    23. Diffusion of Social/Behavioral Sciences Research Methods into Information System/Use Studies

47. A Study of Selected Organized Groups Which Actively Promote Censorship of Materials in Public Libraries and Schools

Exhibit 10. A Classification of Proposed and "Research Agenda" Projects* (Part 1)

RESEARCH AREAS	PROJECT NUMBERS
INFORMATION GENERATION AND PROVISION OF LIBRARY AND INFORMATION SERVICES	
Electronic Generation, Storage, and Delivery of Information	③, 05, 70, 71, 74, 76, 77, 83, 99, (100) (79+80), 101
Automated Reference Services	④, (54)
Information Dissemination--Research to Practice	01
Expansion of Community-Related Library and Information Services	12, 35, 81
INFORMATION USERS AND USES	
Information Needs	07, 08, ⑨, 13, ㊲, (64)
Information-Seeking Behaviors	24, (55), (58), 59, 92
Information Access and Use	⑱, ⑲, 20, ㉑, 41, 52, 53, 56, 57, 60, 62, 63, 69, 72, (78), 90, 91, 93
PLANNING AND EVALUATION OF LIBRARY AND INFORMATION SERVICES/SYSTEMS	
Planning and Evaluation	39, 50, 62, 66, 68
Evaluation of Library and Information Service Effectiveness	14, 15, 16, 25, 40, 45
Collection Development and Preservation	38, 75
Library's Role in Government-Sponsored Dissemination	96
System Performance Measurements	85
Networks	46
Futures	06, 43, 44, 73

*Research Agenda project numbers are presented in circles.

Exhibit 10. A Classification of Proposed and "Research Agenda" Projects (Part 2)

RESEARCH AREAS	PROJECT NUMBERS
ECONOMICS OF INFORMATION AND OF LIBRARY AND INFORMATION SERVICES	
Costs of Library and Information Services	(94) (17+82+36)
Funding of Publicly Supported Library and Information Services	⑪, 33, 51, 95
The Economic Value of Information and of Library and Information Services	㉛, ㉜, (84)
Impact of Electronic Distribution on Conventional Library and Information Sources	02
Information Economy Theory	10, 30, 49
EDUCATION AND PROFESSIONAL ISSUES	
Dissemination and Diffusion of Library and Information Science Research and Practice	34, (97) (98+42+26+23)
Education and Training	28, 48, 88, 89
Library and Information Science Research	22, 27, 87
Library and Information Science	86
Standards	65
Technology Utilization by Professional Groups	67
INTELLECTUAL FREEDOM	㊼

In the chapter that follows, we identify and briefly discuss some of the areas that are not covered in the Research Agenda. However, it is important to comment at this time on two of the obvious "missing" elements in this Research Agenda. No projects are included from the classification category of PLANNING AND EVALUATION OF LIBRARY AND INFORMATION SERVICES/SYSTEMS. This is an artifact of the classification scheme, rather than of the scope and coverage of the Research Agenda. Upon closer examination of the Research Agenda projects, the reader will observe that several projects from other, more specific categories could also be classified as Planning and Evaluation projects.

Another area in which no projects were selected for inclusion in the Research Agenda was Education and Training (within the category of EDUCATION AND PROFESSIONAL ISSUES). The number of submissions of projects in this area was purposely limited because, concurrent with this project, the Department of Education was planning a separate study in this area. At the time of the Airlie House meeting, the Request for Proposal had been withdrawn. The project participants expressed the hope that it would be reinstituted. The consensus was that this area is of vital concern, but that there was insufficient time to deal, de novo, with a challenge of this magnitude. The Request for Proposal in this area has since been re-issued by the Department of Education.

Although we encourage readers to review the full project descriptions contained in Appendix D, we provide in Exhibit 11 on the following pages summaries of each project, to help convey better the scope and coverage of the Research Agenda.

Exhibit 11. Brief Summaries of the Research Agenda Projects (Part 1)

Project 03. Exploiting the True Capabilities of Electronic Publication. Electronic publishing today is little more than the display of printed pages on a screen; the full capabilities of computers are not yet being fully utilized. This study proposes to demonstrate what a publication designed ab initio for electronic access would look like. Demonstrations and experiments would be conducted and user reactions obtained.

Project 04. An Online Network to Support Question-Answering in Libraries. A demonstration and market research project is proposed to build a nucleus database of reference questions and answers, for online access. Such a system could improve the quality of reference service (more accurate answers in less time) and reduce the duplication of effort among libraries.

Project 09. Techniques for Marketing Library and Information Services. If libraries are to achieve viability in the current socio-economic climate, they must adopt more aggressive, bold, and response-oriented strategies. A two-phased project is proposed: a synthesis of information available in all pertinent fields, to identify relevant market research techniques; and an exploratory research project involving case studies of libraries that have used aggressive marketing techniques.

Project 11. Alternative Funding Possibilities for Publicly Supported Library and Information Services. Libraries must develop sources of revenue outside the taxpaying cycle, and fees for services represent at least a partial solution. An evaluative survey of randomly selected libraries is proposed to gather data concerning alternative funding sources that are used, including fees for service.

Project 18. Development of a Conceptual Framework for Observation of User Behavior with Online Information/Data Systems. There is growing interest in data collection regarding user behavior, yet there are no consistently used and accepted techinques for measuring user- computer interaction. This project proposes to develop a behaviorally-oriented model or conceptual framework that can be used for developing observational measures of user behavior vis-a-vis online information/data systems, and to relate the components of the model to specific areas of system design and system performance.

Project 19. The Influence of Selected Information Search Mechanisms on User Behavior. It is generally assumed that users can adjust their behavior to suit the particular requirements of a search system, but it is possible that users retain a "core-concept" of information-seeking methods and use each system on the basis of this approach. System designers need to have a better understanding of the influence of search mechanisms on user behavior. A controlled experiment investigating four basic search mechanisms is proposed.

Exhibit 11. Brief Summaries of the Research Agenda Projects (Part 2)

Project 21. Evaluation of the Changing Needs of Online Search System Users as Influenced by Search Systems Experience. Studies have indicated that users with different levels of training and/or experience vary in system-use behavior. Research is needed to determine how user behavior changes with experience and the implications of these changes for system design. This information could be applied to the design of user interfaces and training programs. A controlled field study of beginning users is proposed.

Project 31. Impact of Information on Industrial Productivity. Since 1972, the productivity growth rate of U.S. industries has dropped, while many other countries have enjoyed increasing productivity growth rates. There may be a positive correlation between investment in information services and productivity growth, but little has been done to measure this relationship. A study is needed to collect data on productivity and investments in information goods and services, for the United States and other industrialized countries.

Project 32. Impact of Public Libraries on Community Productivity. Measures of library productivity now in use permit interlibrary comparisons but do not indicate the economic contribution that a library makes to a community. Research is recommended to develop and test a model for measuring the impact of the public library on community productivity.

Project 37. Consumer Behavior Research Applied to Libraries. Market research techniques are regularly cited as having great potential payoff, but prior studies appear to have contributed little to planning changes in services, resources, and management of the libraries conducting the surveys. Surveys must do more than describe the market; they must identify users' needs so that services meeting those needs can be provided. A project is proposed to review the field of consumer research, identify a model of consumer behavior appropriate to libraries, and test that model in one library community.

Project 47. A Study of Selected Organized Groups which Actively Promote Censorship of Materials in Public Libraries and Schools. The ALA Office of Intellectual Freedom reported a five-fold increase in censorship complaints after the November 1980 election. To be able to plan effective strategies to counteract censorship and promote intellectual freedom, we must be aware of how the censor operates. The study seeks to analyze the characteristics, purposes, and strategies of selected pro-censorship groups, from information gathered through document searches and interviews.

Project 54. Information Transfer at an Online Reference Desk in a Public Library Setting--Design Considerations for Staff and Patron. The objective of this research is to understand what does and might exist at a public library reference desk if the full capability of the information industry were integrated and placed at the disposal of the reference staff and the partron. The study would begin with a literature review and proceed to the development of a prototype system.

Exhibit 11. Brief Summaries of the Research Agenda Projects (Part 3)

Project 55. Direct and Quick Information Retrieval Service in a School Setting. Years ago, researchers at MIT experimented with a "knowledgeable information system" and a group of teenage boys. The researchers hoped to learn how people really want to ask questions and what we might have to do to answer them. This project would review and revise the original MIT study to determine how young people ask questions, the topics in which they are interested, and how computer-based information systems might be used.

Project 58. Information Seeking in High and Low Scatter Fields. Studies indicate that degree of scatter may be a very important variable in researchers' information-seeking behavior. ("Scatter" refers to the organization of the field: low-scatter fields are those in which the subject area is narrow and the literature is well-organized; high-scatter fields exhibit little organization and include many different subjects.) Research is needed to determine how the degree of scatter affects the way people seek information and whether optimal search strategies can be developed for researchers in high- and low-scatter fields.

Project 64. From Childhood to Adolescence; Changing Information Needs. Few studies focus specifically on children and adolescents, and they are often confined to reading and library use, not information-seeking activity in general. A study is proposed to test empirically, with data gathered through personal interviews, certain assumptions about information needs in early adolescence and to determine whether formal instruction on information-gathering makes a difference in strategies for obtaining information.

Project 78. Impact of the "New Literacy" on the "Knowledge Gap" between Demographic Groups. Social researchers have hoped that the "knowledge gap" would be narrowed by the introduction of information media that require less processing skill than books and newspapers. It is not clear whether viewtext systems will in fact narrow the knowledge gap or if the "new literacy" they require (i.e., some understanding of computers) will result only in an increase in the riches of the information "haves." Field research on the use and non-use of viewtext services is proposed, to help answer this question.

Project 84. Economic Value of Investment in Information. "What's the value of information?" This question underlies every decision about investment in information resources, products, and services. The purpose of this research is to establish a methodology for evaluation of the economic value of investment in information products. Input-output industry data will be analyzed to determine the effects of investment in different types of resources.

Project 94. Costs and Cost Analysis of Library and Information Services (combines aspects of Projects 17, 82, and 36). This study combines three separate projects for the purpose of establishing standards for recording and reporting cost data in libraries. Procedures will be developed for collecting and projecting unit costs, standards will be established, and a series of decision-making models that are particularly applicable to automation decisions will be created.

Exhibit 11. Brief Summaries of the Research Agenda Projects (Part 4)

Project 97. Research on the Diffusion of Library/Information Research and Innovation (a combined project that encompasses a new project, 98, and projects 42, 26, and 23). Not much is known about the diffusion of library/information research findings and service innovations. The suggested areas of study are: communication between researchers and practitioners; methods of successfully diffusing and utilizing innovations; the stages through which innovations pass; and the effectiveness of seminars in transmitting research results.

Project 100. The Role of Libraries in Creating and Providing Viewtext Information Services (a new project combining projects 79 and 80). The term "viewtext" encompasses teletext, videotex, and other computer-based information delivery technologies. Studies are proposed to determine which library resources would make unique contributions to community viewtext home information services and to identify the viewtext information files of greatest usefulness to reference librarians in community libraries.

B. DISCUSSION OF PROJECT AREAS IN THE RESEARCH AGENDA

The perspectives brought to the presentation and discussion of project areas covered in the Research Agenda are our own, although we have drawn liberally upon and synthesized a number of viewpoints and opinions expressed by participants in their preparation of research projects and reviews of our draft background materials, and in the course of discussions at the Airlie House meeting.

Information Generation and Provision of Library and Information Services

The set of four individual and combined projects in this area reflects a number of perspectives and concerns regarding the role and impact of various online information technologies in the generation of information for electronic delivery and in the provision of library and information services, using these technologies. Although many of the candidate projects in this area involved one or more of the new technologies being developed for home information delivery systems (e.g., viewdata and videotex), there seemed to be less interest among participants in focusing on any particular technology, and more interest in the substantive issues underlying the definition of appropriate roles for, and effective utilization of, these tehnologies, and in their impact on library and information services.

Electronic Generation, Storage, and Delivery of Information. This area of research is represented by two projects:

03: Exploiting the True Capabilities of Electronic Publication

100: The Role of Libraries and Library/Information Professionals in Creating and Providing New Forms of Information Delivery

The objective of project 03 is "to demonstrate what a publication designed ab initio for electronic access" might be, to promote the development of true electronic publications, i.e., those that exploit fully the capabilities of the electronic media and, thereby, are more effective and useful information resources. In the discussions of this project--and of several others, as well--participants reminded each other of the admonition of Mortimer Taube, in 1964, the year of the study that launched MARC, not to simply convert the 3x5 card into machine-readable form.

Project 100 is a combination of two different projects, proposed by the same individual, that explore the role of the library (in this case, the community library) as a viewtext information provider and user. ("Viewtext" is used by the author to cover various electronic information delivery technologies.) The perspective in these studies is that the library should not be by-passed in the development of home-information delivery systems and that the library, like other information organizations (e.g., newspaper publishers), must learn the types of materials that are likely to be wanted by users of these systems. The second study reflects the importance of the library's becoming a subscriber of such systems, for purposes of enhancing its services to the community, not all of whom will have direct access in the home to these systems.

Use of Automation in "Reference-Desk" Services. With two different approaches, and somewhat different issues to be addressed and hypotheses to be tested, two researchers proposed projects dealing essentially with research and development in the area of applying automation to the reference desk (question-answering) services of libraries and information service organizations:

04: An Online Network to Support Question Answering in Libraries

54: Information Transfer at an Online Reference Desk in a Public Library Setting--Design Considerations for Staff and Patron

One underlying objective of such studies is to move the library network activities into cost- and resource-sharing in the reference area. Another objective is to develop some means to help improve the quality of reference service, given the fairly distressing results of studies recently conducted that have indicated a lack of accuracy in reference service.

To the extent that both of these studies suggest the need for a prototype system and database, for purposes of testing various research questions, it should be pointed out that one additional issue--copyright--is certain to be raised in the course of any such development. The realities of potential problems in this area were not discussed at the meeting.

Information Users and Uses

A total of nine projects in the Agenda focus on one or more aspects of information needs of users, information-seeking behaviors, and information access and use. These were selected out of a total of at least 29 projects that addressed issues and questions in this area. In some ways, this area was more difficult than others for the group to evaluate, given all of the possible population groups, objectives, and methodologies to be considered. In general, projects with more innovative approaches and the broadest possible applicability to various population groups and institutional settings tended to be rated more favorably. We sensed, in this area, particularly, the group's determination to deal with broad issues and concerns and not to make statements about the relative importance of one population group or institution over another.

Information Needs. A set of three projects can be grouped in this area:

64: From Childhood to Adolescence; Changing Information Needs

37: Consumer Behavior Research Applied to Libraries

09: Techniques for Marketing Library and Information Services

The first project represents a carefully considered exception to the principle of not focusing on particular population groups. This selection resulted from a fairly lively debate on the status of our knowledge about the needs of various populations. This debate was triggered by discusssion on the needs of academicians, in conjunction with project 13:

> Some people believe that academicians have not had a chance to spontaneously and freely express their information content and channel preferences. But, they certainly have. No one has put constraints on their responses. I feel they are most readily studied by discipline, since their discipline conditions them to collect information in certain ways. They are next most readily studied in their organizational settings. ... we need codification of past user descriptive resarch more than new data collection.
>
> Does this apply to children and adolescents?
>
> No. Groups that have not had their descriptive studies done are still waiting in line to be studied. Especially groups that are undergoing drastic change, such as children, should be studied.
>
> I disagree that we know anything about academicians' preferred information seeking behaviors. They answer questions the way they think they are supposed to...
>
> I won't dispute the phenomenological validity of what you're saying, but it doesn't come out in the data.

This particular exchange most likely had an impact on the group's selection of project 64 for inclusion in the Research Agenda, more on the basis of its objectives than of its particular methodology. Another comment from a practitioner may also have had an impact on the group's decision to minimize its focus on particular population groups. The opinion was expressed that methodologies in user studies were what was most important, because user studies needed to be conducted locally, i.e., by the organization that provides the library and information services. This practitioner's feeling was that the results of experimental user needs studies were not necessarily transferrable or applicable to particular situations, but that well-tested methodologies were.

Some of this same rationale can be applied to the other two projects that are included in this area. It has become more acceptable over the past several years to view the information user as a "consumer" and to look toward those aspects of marketing (e.g., identifying consumer needs and preferences, as well as planning for product/service development and promotional strategies) that may have application in the practical aspects of planning library and information services. We see the two marketing-related projects as belonging in this context, although one could also think of them in terms of management and planning.

Information-Seeking Behaviors. The more theoretical aspects of this area are represented in these two projects:

55: Direct and Quick Information and Retrieval Service in a School Setting

58: Information-Seeking Behavior in High and Low Scatter Fields

Both of these projects, although described in the context of specific research environments, were felt to involve compelling methodologies that could have broad applicability.

Project 55 only incidentally involves the school setting. Its population focus is on school-age children, but it is considerably different from the earlier project (64), because it is not concerned with any existing system, nor with instructional or guided information-seeking activities. Building on an early MIT study, this project is intended to learn how questions are asked and what kind of system is needed to answer those questions.

Project 58 also builds on earlier studies that may have been under-utilized in exploring differences among researchers' information-seeking behaviors, which may depend upon the amount of "scatter"--degree of organization and structure--in a given discipline.

Information Access. Three projects in this area involve a number of research questions intended to advance our knowledge of the online system/user interface:

18: Development of a Conceptual Framework for Observation of User Behavior with Online Information/Data Systems

19: The Influence of Selected Information Search Mechanisms on User Behavior

21: Evaluation of the Changing Needs of Online Search System Users as Influenced by Search Systems Experience

Because these three projects take advantage of the "living laboratory" of online users and systems, which is already in place, we have elected to treat them here in context of the ways that users access information--in this case, through an online system--rather than in a traditional "system design" type of category.

The types of questions raised in these projects include: (1) How does the fundamental design of the user interface influence user behavior vis-a-vis online interaction, and what invariants and/or commonalities in the user/system interaction patterns exist across distinctly different user interfaces? (2) How does user behavior change with respect to online system use, as a function of experience gained with the system, and what implications does any change in behavior have on system design? With all of the recent efforts on the development of "user-friendly" interfaces, to help support end-user access to bibliograhic systems and public access catalogs, it is important for us to learn not only what is needed to encourage novices to use online systems, but to know how long they are likely to remain in this category and what kind of systems and interfaces will be needed to support their access patterns over time.

Since project 18 is designed to help develop some standard methodologies for capturing access data online, it can be viewed as a starting point, for projects 19 and 21, which raise questions of major relevance to a broad set of systems--bibliographic, non-bibliographic, public access catalogs--and to a broad set of users, including intermediaries and end users.

Information Use. The basic research question posed by the author of project 78, Impact of the "New Literacy" on the "Knowledge Gap" between Demographic Groups, is whether the newer viewtext-type systems can succeed where other technologies (e.g., radio and television) have failed, to make information more accessible to all population groups and sufficiently interesting to be used. This project raises important questions about the equity of information access that are of immediate concern to publicly supported library and information service organizations, and that are also matters of broad information policy of concern to our entire field.

Economics of Information and of Library and Information Services

The selection of five projects in this area reflects a sense of urgency in several areas: the development of better (and more standard) ways of assessing the true costs of library and information services; providing more stability in the funding of publicly suported library and information services; and establishing a means of articulating, in some concrete way, the value of information to those outside our profession.

In its final selection of projects, the participants stopped short of agreeing among themselves on the relative importance to our field of the general issues being studied on the "information economy." A stronger consensus emerged on the need to study the micro-economic issues involved within the boundaries and more limited scope of library and information service providers.

Costs of Library and Information Services. This area is represented by a set of projects that were combined into Project 94: Costs and Cost Analysis of Library and Information Services. In combining three projects (17, 36, 82), the intent was to suggest the need for a multiple-phase study to develop standard accounting practices, to use those procedures in developing standard per-unit costs, and to apply them to particular management decisions--in this case, to the development of cost and performance models for evaluating library automation programs.

Although this area may not break "new ground" in research, it seemed to be the consensus of the group that work needed to be undertaken to encourage library and information service managers to develop the tools for a more "business-like" approach to management, required in an environment of limited funds, and to use such tools.

Funding of Public Libraries. An important exception to the spirit of the group in dealing with projects in an institution-independent way is represented by the inclusion of Project 11: Alternative Funding Possibilities for Publicly Supported Library and Information Services. The inclusion of this project also reflects more of a concern that the underlying problem of funding stability be represented in the Research Agenda than any consensus on the merits of this particular project. (A discussion about the candidate projects in this area was reported earlier, in Chapter IV.) Nevertheless, Project 11 deals with an important objective--to study the viability of a number of alternative funding options available to library and information service managers.

The Economic Value of Information. The inclusion of three projects in this area, one of which (84) was rated highest in each successive voting, suggests that a sense of urgency is developing about the need for our being able to communicate to business, government, and our communities of leaders and users, the value of information in terms that can be understood, for example, as a "return on investment." Perhaps because of its visibility in the business and popular literature over the past several years, "productivity" was the key focus in each of the three Research Agenda projects:

84: Economic Value of Investment in Information

31: Impact of Information on Industrial Productivity

32: Impact of Public Libraries on Community Productivity

We believe that the intention of the participants, in these selections, was to emphasize the importance of this overall program area and to suggest that multiple studies are needed, the methodologies for which may be derived from the proposed projects and/or from support for preliminary research to develop a set of appropriate methodologies.

Educational and Professional Issues

The Research Agenda meeting itself stimulated expressions of very strong interest and concern about the dissemination and diffusion of research information and about improving communications among researchers and practitioners. In the process of reviewing and evaluating projects, participants were repeatedly raising questions as to whether work was being done in an area and whether there was work on which new research should build. There was also a strong sense among the participants that the mechanism provided by the Research Agenda meeting, to facilitate communication among researchers and practitioners, was one that needed to become more "institutionalized" as a process in our field. In this regard, the group asked one of the researchers to address the area through a combination of several candidate projects, no one of which alone was sufficiently forceful to be selected among the top 20.

Project 97, the resulting "combination project" description, included a newly developed project (98), along with three projects proposed in advance of the meeting. The four component projects are:

98: Analysis of Effective Researcher-Practitioner Linkages in the Library/Information Field

42: Diffusion of Innovation in Librarianship

26: "Pathfinders": The Diffusion of an Information Innovation

23: Diffusion of Social/Behavioral Sciences Research Methods into Information System/Use Studies

It is ironic that a field that has addressed itself to so much study of the information transfer and utilization process in other fields and disciplines has not previously perceived clearly--or, at least not expressed clearly--the need to invest in study of itself.

Project 47, "A Study of Selected Organized Groups Which Actively Promote Censorship of Materials in Public Libraries and Schools," represents a very different kind of education and professional issue. In the author's rationale for the project, the point is made that, if our field is to prepare for the censor and plan its counter-strategies effectively, it must learn more about the characteristics of those individuals and groups who would actively promote censorship.

This project provides a useful illustration of how "problems" can be translated into researchable problems. Some problem areas seem to involve attitudinal, economic, or political considerations that do not lend themselves to research. On the other hand, as shown by the author of this project, it may be that we can translate such problems into a set of research questions that identify clearly what it is that we want to learn or test.

VI. INTERPRETATION AND USE OF THE RESEARCH AGENDA

In this chapter, we discuss what the Research Agenda is and is not, and we draw attention to a number of different ways in which it can be used. The discussion draws upon and synthesizes various viewpoints expressed by the Research Agenda participants and Colloquium attendees, as well as the views of the project staff.

The purpose of this final chapter is to interpret the project--both the process and the product--in terms that can be translated into followup activities and actions. The primary objective of the project was to assist the Office of Libraries and Learning Technologies in its research planning, but it was recognized by those involved in the project that, with adequate dissemination and followup discussions and debate, it could serve a much broader set of purposes within the library and information science community. Those uses can be defined only after this report (or the Summary volume) has been reviewed and discussed within the profession, but an important start has been made in the discussions held at an OLLT-sponsored Colloquium in December 1981. The representatives of 15 library and information science organizations who attended this meeting are listed in Exhibit 12.

In sponsoring the Colloquium, as a first step in promoting wide dissemination of the Research Agenda, OLLT has underscored the importance of this project as a focal point for improved communication among those involved in conducting and using library and information science research. This importance was also reflected by the participation of Department of Education Secretary T.H. Bell and Assistant Secretary D. Senese in the Colloquium.

A. INTERPRETATION OF THE RESEARCH AGENDA

The Research Agenda meeting plan provided the opportunity for participants to add, revise, or combine research projects, in accordance with their views of the research that is most needed. It is inevitable that the resulting Research Agenda reflects the mechanics of the process used in defining these projects and the composition of the group that created and judged them. One

Exhibit 12. Attendees at the OLLT-Sponsored Colloquium on the Research Agenda Project, in Washington, D.C., December 2, 1981*

Carol Henderson, American Library Association

Betty Buckingham, American Association for School Librarians

Carol Johnson, American Society for Information Science

Harold Goldstein, Association of American Library Schools

JoAnn Harrar, Association of College and Research Libraries

Rolland Billings, Association for Educational Communications

Carol Mandel, Association of Research Libraries

Patty Klinck, Chief Officers of State Library Agencies

Peter Dahl, Council of Chief State School Officers

Deanna Marcum, Council on Library Resources, Inc.

Henriette Avram, Library of Congress

Estelle Williamson, National Association of State Educational Media Professionals

Bessie Moore, National Commission on Libraries and Information Science

George Ginader, Special Libraries Association can assume that different sponsoring agencies might have used a different methodology and/or that other groups of researchers and practitioners might have created and selected different final sets of projects.

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*In addition, there were observers present from several government agencies, including the National Science Foundation and OLLT, and from several professional associations and societies.

Recognition of these possibilities should not diminish the importance of this meeting's results, since the participants were painstakingly selected, they came well-prepared to undertake the task at hand, and, in spite of the lack of time to step back and review all of the work that had been done, the mechanics of the project, including the Research Agenda meeting, "worked." It does, however, underscore the need to avoid thinking of this particular Research Agenda as "The" Research Agenda, which should be adopted or followed without any further review, development, or exercise of judgment. It is not at all appropriate to think of the Research Agenda as a set of "ready-to-fund" projects. It is more appropriate to think of it as one carefully considered statement of proposed research priorities for the library and information science field, at a given point in time. As such, it can properly be used to guide and support the allocation and targeting of present and prospective research funds. But, equally important, it can also serve as a useful point of departure, to be used not only by OLLT, but by the profession as a whole, for further definition of research priorities.

Areas for Further Review

Some readers will wonder why particular project or program areas are not represented in the Research Agenda. There are many possible reasons, not all of which were (or could be) made explicit in the process of evaluating and rating a total of 101 projects within a limited period of time. Some projects received ratings that placed them very low within the particular group of projects under discussion and, unless they were "upgraded" in later sessions, they would not receive much discussion in the review process. Some projects on whose merits everyone was in agreement were also likely to receive minimal discussion, because of the very fact that there was agreement. The criteria being used by the participants tended to become explicit primarily when there was considerable disparity in the ratings. In plotting the distribution of the pre-meeting ratings, we found that most of the projects received ratings from 1 through 5, on a five-point scale. That is, they received 1s and 2s and 3s and 4s and 5s. (See Exhibit 8, shown earlier in Chapter IV.) It was these projects with highly disparate ratings that tended to receive the most attention in the group discussions.

In these discussions, it became clear that, for some projects, the general areas of need may have seemed important to members of the group but the descriptions of the research objectives and/or the methodology were not sufficiently clear or compelling to promote broad acceptance. In other cases, the proposal idea per se was impressive but the area of need did not seem as important as others. The participants attempted to achieve some type of balance across a number of different--and equally important--program areas and, at the same time, to maintain their focus on the most promising and well-considered research projects.

The participants admittedly were not experts in all of the areas covered in the submitted projects and they recognized that the researchers could not, in the limited time available, prepare state-of-the-art papers, in support of their projects. Therefore, one desirable followup activity would be to have expert researchers and practitioners in various areas review these projects and develop more in-depth statements about each program area. They could use the Research Agenda projects, and other projects that were not included, as illustrations of the types of efforts needed to build on previously conducted work or on research in progress, and they could also provide an appropriate rationale in cases where there was a clear need to break new methodological ground.

Such reviews by additional groups of expert researchers and practitioners in various areas can also help to identify areas that are not adequately represented in this Research Agenda. The areas identified by the Airlie House participants and the Colloquium attendees as needing further consideration included: education and training; preservation and protection of materials in both conventional (e.g., book) and non-conventional (e.g., magnetic, video, and optical disk) forms; impacts and more effective use of technologies in the workplace; and management planning and evaluation. These and other suggested areas of potential interest are shown in Exhibit 13. This display represents ideas, research questions, and problem areas that were identified by the participants in the course of the project and, as well, by interested other professionals who submitted suggestions for consideration at the Airlie House meeting. We would also recommend a review of the projects not included in the Research Agenda (see Appendix E) and the suggestions and comments made by the "Gatekeepers" (see Appendix B).

In using the Research Agenda as a stimulus for further conceptualization and mapping out of the research needs in our field, it is important to maintain the focus solidly on research. We tend, in our field, to identify our problems and major issues without articulating specifically the questions that need to be answered through research. If, for example, the cultural and recreational value of libraries is not well understood, it is not enough--from the research standpoint--to dwell upon the importance and seriousness of the problem. We must also translate our concerns into questions and/or hypotheses that can be addressed through research.

This emphasis on "researchable" problems and issues does not necessarily mean that we must be able to specify in advance the particular study approaches or methodologies needed to accomplish the desired objectives. In fact, if we are to break some new ground in conducting research on particularly difficult issues, we must convince the sponsors of research that support is needed for preliminary investigations that can help to develop appropriate theories and methodologies.

The Research Agenda as One Vision of the Future

The title of this project specifies the time frame that was to be addressed in the Research Agenda: the 1980s. It also expresses OLLT's belief that the project focus was not to be limited to the problems of today but should consider, as well, the future toward which our field must work.

Exhibit 13. Other Research Areas and Questions to be Considered in Further Development of the Research Agenda (Part 1)

INFORMATION GENERATION AND PROVISION OF LIBRARY AND INFORMATION SERVICES

What are the barriers to electronic information as a primary publication system? A complete model of a system in which most primary publications exist in machine-readable form should be developed. The model should include authorship, editing, copyright, access, citation, preservation, distribution, etc. What barriers exist in making such a system work?

Effective utilization and impact on library/information services of workplace-related technologies, e.g., retrieval of full text. Word processing creates large quantities of unstructured full-text information. How do we retrieve/use such information?

Use of information networking, via cable, in school-public-special libraries, and statewide home and library delivery by Public Service Television of State Library Agency utilizing satellite technology, teletext, videodisc, etc.

Provision of effective automated access to books in non-Roman alphabets.

The library as an information service contractor: a study to identify information-related, contracted services used by cities, and to postulate how the library could have handled these services. The goal is to identify those types of services that the library could provide as an information service contractor to local, state, and federal agencies.

INFORMATION USERS AND USES

The librarian as a personal information contact (the family librarian). Some evidence exists that people resist the bureaucracy when personal contact is difficult. Law and medicine are two professions where the user may have a personal contact as an intermediary to specialists via their family legal counsellor and doctor. Two libraries (at a minimum) are selected. Every other new registrant is assigned a personal librarian. A brief interview is held with the new registrants and the personal librarian introduces the user to the types of services available. A business card is handed out; the user may call when help is needed to get the services needed. An evaluation is done of the attitude and knowledge concerning the library in both groups to determine whether the user as client has different perceptions than the user in general.

Impact of computer/video games on learning.

Exhibit 13. Other Research Areas and Questions to be Considered in Further Development of the Research Agenda (Part 2)

PLANNING AND EVALUATION OF LIBRARY AND INFORMATION SERVICES/SYSTEMS

Implications of rapid transfer to electronic information services in U.S. upon information exchange with third world. What potential imbalances could occur if U.S. begins to have most primary publications in machine-readable form. How would information be shared with less advanced countries? What are the implications for library development? Whose problem is this?

Library contribution to the Quality of Life. The President's Commission for a National Agenda for the Eighties included a panel on the Quality of American Life. Much concern was expressed by citizens on the quality of life and an interest to regain some control. These concerns included basic needs: jobs, health, shelter, safety and cultural needs. Can we develop a classification that would describe the contributions libraries do and could make to the Quality of American Life?

Research is needed that can prove that a quality library or library media program does make a direct and quantifiable contribution to the overall excellence of a school, college, or business program. The research should establish (if the data supports it) the inter-relatedness of programs and services which these libraries must develop and maintain.

Preservation problems for electronic libraries and archives. How permanent are the new storage media? How good are magnetic tape archives without permanent documentation/software to access data? Can we identify these problems now and begin to alert appropriate organizations? What should be saved and what will be the cost? Should copyright include a preservation fee?

Sources of error in reference services. Childers and others have done studies indicating that reference service "often" provides incorrect information to library users. This study would analyze the sources of error in reference service: communication errors, reference library error, source error, etc.

Library statistics. Present statistics gathered are based on standards drawn up in the 1960s. We need a proposal for a field test of new standards for library statistics and for bibliographic equivalents of reel microfilm in various types of library collections.

Study of unionization, which exercises subtle but meaningful impact upon role, governance, administration, management, decision-makers, and users.

Library services to a leisure society. Some observers believe that new technologies, including robotics, will lead inevitably to more worker displacement and more leisure. The library's leisure support activities are often less well regarded professionally and are given little attention. If we postulate a leisure society, how would/could libraries change to accommodate and provide effective services?

Exhibit 13. Other Research Areas and Questions to be Considered in Further Development of the Research Agenda (Part 3)

Re perceived value of library as preserver of cultural experience and information heritage: there is a great interest in cultural and historic preservation at the same time that library observers appear to be criticizing the library's role as a preserver and storer. How important is this role? Are people willing to support it? And, if not, will some other agency provide it? How should we determine what should be saved?

ECONOMICS OF INFORMATION AND OF LIBRARY AND INFORMATION SERVICES

Impact of the library economy on professional and scientific associations. What percentage of the budgets of learned groups is provided by library memberships, subscriptions, purchases, etc.? What changes in the library economy would be felt in these groups?

Federal investments in information agencies, services and products. Basically, this seeks to determine the investment federal government is putting into the U.S. library system in comparison to its total investment in its own libraries and information services and products, as well as its subsidies through grants to other groups and contracts. Information should be defined fairly narrowly for this study.

New concepts of capital acquisition for technology transfer to libraries. This study explores a broad range of possible methods that could be used to raise capital for large scale technology transfer. It then indicates those that might appear fruitful for consideration. Implicit in this study would be the need for legal changes to allow new ventures.

Forging a partnership between the public and private sectors to provide capital and "imagination" for application of technology to library information programs.

EDUCATION AND PROFESSIONAL ISSUES

Capitalization for an average library worker is $300, while, for an industrial worker, it is $20,000. Why has there been a failure to provide library workers with the tools they need? What is the needed capital per worker for equipment in light of today's technology? What kind of investment are we talking about over the next two to three decades?

60 to 70% of citizens are served by small libraries that have staff with no professional training. Increasingly, networks are developing around these libraries. Are we going to end up with a library system segregated by technology? What can be done?

Continuing education programs to develop librarians' competencies to deal with high technology.

In a self-critique of their work at the Airlie House meeting, several participants wondered whether the Research Agenda was sufficiently forward-looking.

> I wish we had the capacity to be more visionary...perhaps we haven't been very future-oriented because we're such rational people.
>
> Is this a research agenda for the 1980s or only the second half of 1981? Does it reflect enough risk taking?
>
> Futures scenarios are going to be very different in different types of libraries, and we have not specified those multiple futures. For example, we haven't addressed the enhancement of the transfer of knowledge through multiple technologies (videodisc; computer graphics) that will be available to children.

The participants differed in the extent to which they could--or wanted to--detach their project evaluations from present-day concerns. They also had different views on what constitutes a "visionary" Research Agenda. One of the Colloquium attendees said: "...for a lot of us, the research projects that have been considered are very visionary. Maybe the report should indicate that this is truly an agenda for the late 1980s or early 1990s...because many of us are not likely to meet this agenda even in the year 2020."

We fully expect to encounter a similar diversity of views within the library and information science community, with respect to the need for a conception of the future. While individual visions of possible futures were helpful in providing a rationale for the Research Agenda projects, there is validity in other views, such as these:

> The value in any of these types of projects is in eventually doing something. ...in the world we live in, you have to have a little bit of courage and conviction and do something about it, on the assumption you will never know all you want to know. We could postulate about the future forever.
>
> My view of the future is that we create it, rather than trying to agree on some over-arching vision that we're all going to follow.

One important message from this diversity of views is that there should be overall balance in our research programs between projects that deal with more immediate problems and those that help us create new futures and possibly even avoid some types of problems. There must be support for the risk-taker, the visionary, and the dreamers, just as there must also be support for those who help to deal with the "real-time" needs and problems.

B. POTENTIAL USES OF THE RESEARCH AGENDA

Given appropriate dissemination of the project reports and the development of appropriate mechanisms and forums in which to share reactions among various library and information science professionals, this project can be used to help bring attention not only to research needs in the field of library and information services but also to the need for developing our capacity to conduct and use that research.

Possible outcomes from the development of appropriate dissemination and discussion mechanisms are offered for consideration in the sections below.

Development of Statements of National-Level Research Priorities

The first order of business in exploring this possible use of the Research Agenda is to assess the level of acceptance that can be achieved across the various special interests in the library and information science community in the development of a common set of priorities. We emphasized earlier in this report the importance of this broad professional outlook that was assumed by the project participants in meeting the goals of this project. Both the likelihood and the desirability of this outcome being achieved were debated by the Colloquium participants, as witnesss these comments:

> I think there's a danger in a national agenda as a set of projects or priorities that can possibly sink to the lowest common denominator. I think there's a reason for multiplicity and specialization, and so you want to use an agenda, I would think, more as a coordinating device than as something that would please everyone.
>
> I support the over-arching point of view (represented in this Research Agenda) because I think we have a tremendous amount of duplication and, in times of lack of funding, this is a terrible thing. ...but it needs to be pointed out that, given the many communities and specializations involved, this may not do for everybody.

> I firmly believe in looking forward to the 90s and that we have to have an umbrella approach... We all have various and sundry likes and dislikes, but at some point we have to look to each other. We can't just isolate ourselves and think about our own little domain. The link and application to various specializations can be done...it's how creative and how systematically it is done.

Another aspect of the concept of priorities that was discussed by Colloquium attendees is the interpretation of the Research Agenda as a "blueprint" or "cookbook." As the group was told, it was not the intention of OLLT or the project staff to develop a set of priorities that would be used in a highly prescriptive fashion or in a way that would lock a funding program into a fixed set of objectives for the remainder of the decade. Interestingly enough, a number of the Colloquium attendees felt that there were potential benefits in eventually having some sort of cookbook. They pointed out that, without a cookbook, decisions are more likely to be made without purpose--without an overall framework and a defined set of objectives. Other participants pointed out the danger of interpreting any set of priorities as a singular and exclusive statement of needs, as opposed to a statement of major concerns and issues to be addressed.

Agreement on the potential value of the Research Agenda as a departure point for discussions leading to a statement of a national-level set of research priorities was not reached at the Colloquium, nor had we wanted or expected to achieve such an objective. Representatives of the various associations and organizations said that it was important to have the report discussed by members of their research committees and other advisory bodies, and to discuss in more detail its implications with their own constituents. It is important to note, however, that there was consensus on the need to continue the momentum of the project, including the Colloquium discussion, and to use the Research Agenda as a focal point for inter-society discussions, perhaps under the auspices of a single group, such as the National Commission on Library and Information Science.

As the Research Agenda is reviewed by various groups within the library and information science community, it is important to keep in mind that acceptance of this project as a point of departure does not mean that individual and organizational stakeholders must endorse every project included in the Research Agenda, nor must they endorse with equal enthusiasm all of the research areas represented by the Research Agenda projects. Use of the Research Agenda in moving toward a "national-level" statement of priorities would, however, require a continuation of the commitment started at the Airlie House meeting to move beyond our more individual and immediate concerns, and to view our field in a cohesive rather than fragmented way, with emphasis on our common needs rather than our differences.

It remains to be seen whether the current environment of austerity and reduced government funding will serve to dramatize the need for the various elements in the field of library and information science to pull together and combine forces in defining the most productive investments in research to benefit all institutions and organizations that are concerned with principles, theories, and effective practices in library and information service.

If the development of a common set of research priorities is not a realizable objective, perhaps an alternative but also beneficial use of this project and its results could be explored. The results of the present project can provide some immediate guidance to funding organizations and agencies, to professional organizations, to library and information science schools, and to individual researchers and practitioners throughout our field that need and want such guidance, as a starting point in developing their own research agendas.

Role of the Research Agenda in Promoting Improved Communications

There are a number of ways that individual institutions and organizations can use this report, and the Research Agenda specifically, to focus attention on research in the field of library and information science, quite apart from any implications for developing a coordinated or national- level statement of priorities. Perhaps the strongest endorsement for this particular outcome is represented by the presence in the Research Agenda itself of projects--in fact, of a program area--devoted to the dissemination and diffusion of research in our own field. As pointed out earlier, in Chapter V, it is ironic that a field that has studied the adoption of innovation and various aspects of the dissemination of information and diffusion of knowledge in many other disciplines has yet to devote similar resources to self-study.

In this section, we identify several types of objectives that could be pursued, as a means to draw attention--both within and outside the library and information science community--to the need for research and to specific research needs.

Dissemination within the Library and Information Science Field. In the course of the project, and particularly in the discussions at the Airlie House meeting, a number of concerns were expressed about the nature of research in our field. Some of these concerns were reflected in the specific projects proposed for (and accepted in) the Research Agenda. For example, the presence in the Research Agenda of a major project (97) on the dissemination and diffusion of research and practice in our field reflects strong concern about the dissemination and use of research and about communication between and among researchers and practitioners. In the words of one practitioner:

> I would like to see more discussion about how to improve communication and the dissemination of information in terms of what's going on in research versus the world at the firing line. I'm appalled at how under-informed I am about research going on in the field. Perhaps this process (the meeting) will help to establish more interactive communications in the future.

It seems apparent that, if the investments in research are to have a commensurate impact, it will be necessary to develop a greater commitment to the dissemination of research results. This point has already been made throughout this report, but it should be re-iterated in the context of funding support. A research project should not only have funds allocated to a literature search, to help ensure that the new work builds upon prior research, but it should have funds committed to the dissemination of the research results, to help support their translation, as appropriate, into practice. Alternative mechanisms for dissemination need to be explored, relative to various types of research projects, to help ensure that the end product of research is more than a final report that is entered into one of the document-provision services, as its final resting place. More face-to-face communication among researchers involved in an area, and with practitioners who may be interested in or affected by certain types of research, are needed to help effect greater use of our knowledge base.

Communications with Potential Supporters and Sources of Funding. At the Colloquium, a number of questions were posed abut the means by which some or all of the research projects identified in the Research Agenda could be funded. As a historical note, the assumption was made at the outset of the project that, when we finished identifying what research was needed, a quite separate set of actions--outside the scope of the present project--would be needed to obtain funding for that research. The issue of "fundability" for specific projects was raised at the Airlie House meeting but was not permitted to intrude on the basic question of what it was that needed to be learned through research. In a sense, the Research Agenda is an "innocent" document; it says, "Here is what we think is important, and here are a set of priorities." It makes no assumptions about whether these projects would or could be funded by an OLLT, by an EXXON, or by any other type of organization.

It is useful to call attention to these different kinds of potential funding sources, because there is increased recognition of the need to seek a broader base of funding support, beyond the traditional government agencies and national-level organizations. We need to enlist support from the private sector and, in addition, we need to consider how to tap local financial resources. The estimated cost of funding all 20 of the Research Agenda projects is approximately $5 million. The true costs would be even greater, given the likelihood that each program area will require multiple projects and/or multi-phase studies. No single source or set of sources is likely to undertake all of these projects, particularly when one considers the diversity of areas covered.

One Colloquium participant stressed the need to bring the concept of research support into local institutions. As an example, she pointed to a recent research project that was defined and co-sponsored by a group of four library organizations in two states. These library organizations were able to argue effectively to their local governments that such a study was a cost-effective means of supporting their own budgeting, planning, and evaluation processes.

The discussion of funding support also led the Colloquium participants into the idea of using the Research Agenda and the project reports to help communicate excitement about the future of library and information services to possible research supporters. One of the participants expressed both the challenge and the opportunity in terms of a story about the deputy state librarian in her state, who was asked by a fellow passenger on a flight what kind of work he did. When he said that he was an "information specialist," the other passenger assumed that he worked for IBM and was startled to learn that he was a librarian. This other passenger asked: "Is information something new in libraries?" With this background, the attendee continued:

> ...I think that you have a little bit more opportunity in the private sector than you folks seem to think, if it's presented well. This is the kind of effort that will get the business sector interested in an effort that we're interested in. ...Nobody is going to get excited, in the business world, about what they consider the "old-time library" effort. Although they may revere and respect it, they're not going to be excited about it. And I think this (the Research Agenda) has great potential to create that excitement.

The group identified a number of different organizations, including the Information Industry Association, the Association of American Publishers, the Council of Communications Societies, the Association of American Universities, a number of private foundations and scientific societies, and various government agencies and organizations, and the popular business press, as groups that should be informed in some way about this project. It was also agreed that, because these groups have different interests and perspectives, it would be desirable to tailor such communications, an activity that might be undertaken by the leadership of various organizations in the library and information science community.

Improving Our Capacity To Do Research

It was apparent to the participants in the Airlie House meeting that one of the most important problems that the library and information science community must address is improving our capacity to do research. This need was apparent in the meeting, as individual projects were examined and evaluated, and it was apparent to the project staff, as they prepared material for presentation, in the Colloquium, in this report, and in the summary document. Even experienced researchers do not always define research objectives as clearly as they should be defined or define the best methodologies to fulfill those objectives.

Several of the Airlie House participants commented on the problem, which they felt was worthy of interest in its own right. The point was also made that, in addition to developing research capacity among library and information science faculty and students, there was a need to develop among managers and other practitioners the capacity to interpret and use research findings.

The federal government sometimes contributes inadvertantly to the weakness in research capacity, in its Requests for Proposals. RFPs are frequently too detailed in their design specifications, leaving very little room for--and, in fact, penalizing--researchers who would propose creative and innovative research approaches to the problems being attacked. Detailed and rigid specifications are highly appropriate for some types of contracts, but there are also areas in which the contracting process should provide the opportunity for significant intellectual contributions by those who respond to the government's requests. They should also provide the flexibility needed in some research projects to respond to the findings and/or problems encountered in the early stages of a project.

If, in the process of drawing attention to some of these professional concerns regarding the conduct and use of research, this project helps to stimulate a revitalized and healthy climate for research in our field, it will have served a most valuable purpose.

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APPENDIX A

RESULTS OF LITERATURE SCAN

In this section, we present the results of our literature scan. A visual presentation of these results appears in two columns: the left-hand column is a listing of Problems/Issues/Topics, and the right-hand column, of Research/Study.

The entries are organized according to the classification framework described earlier in this report, in Exhibit 2. The entries are, in most cases, annotations, not actual titles. With a few exceptions, names of suppliers, states, libraries, and other named references have been removed. We included some English-language, non-U.S. works, where they were felt to be highly pertinent to this task. These non-U.S. entries have the country of the author in parentheses, generally preceding the annotation.

The Problems/Issues/Topics were identified primarily from the scan of actual issues of professional publications, although some were identified from the online search bibliographies, where it could not be determined whether the item represented by the citation had a research focus. The codes given in parentheses after an annotation indicate one or more of the following types of source items:

(B) = Book Review
(L) = Letter to the Editor or Editorial
(N) = News Item
(F) = Feature Article

A code is given twice, e.g., (BB), in those instances where we identified two or more unique items on that particular topic.

In the right-hand column, we have summarized the content of the research articles and reports. In some cases, items represent research in progress (from SSIE). Where it was possible to determine the type of research methodology that was used, we have noted it in parentheses, after the annotation.

Citations from the online search of COMPREHENSIVE DISSERTATION INDEX (Dissertation Abstracts, without abstracts) are identified as such. Items that are not marked are either theoretical papers or works for which the research methodology could not be determined.

The spacing of items is intended to show only a general correspondence in subject matter between entries in the two columns. Direct correspondence between a specific problem and a research project clearly could not be determined without studying the source materials involved. However, the groupings within the listing are provided so that the scope and variation in subject matter covered in the source materials could be reviewed more easily. Many items could, of course, be classified in any number of categories, but we have elected to place each item in the listing only once. During scanning and analysis, we removed all obvious duplications.

CREATION OF INFORMATION

Publishing

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Overview of publishing (B) Publishing economics: online vs. print (B) (L) Alkalization of paper to promote permanence (F) Involvement of librarians in pre-publication phase of literature to ensure literacy standards (F) Elitism in publishing and its influence on libraries (effects of big-company takeovers) (F) Marketing practices of paperback publishers (F)	Survey of practices and attitudes of librarians and individuals in placing, renewing, and cancelling of journal subscriptions (Survey) Evaluation of dual pricing structures (individual vs. institutional) of journals in health sciences (Survey) Economics of journal and monograph publishing Electronic processing as a solution to economic difficulties of small journals Comparison of two databases--coverage of psychological literature Overlap of secondary services in coverage of primary journals and journal articles U.S. secondary information services in physical sciences and engineering--evolution and trends (Dissertation) Examination of three different techniques used to measure readability of text to see if they correlate
Use of microcomputers in data entry to publish bibliographies (F) Use of computer networks for editorial processing (F) Implications of computer networks on editorial processing (F)	Trends in use of computers in publishing (Literature Review) Interactions between scientists and the journal publishing process (Dissertation) Project designed to stimulate adoption of innovations by scientific and technical publishers (Survey) Use of automation to aid in detection and correction of spelling errors in database generation (Experiment)
Micropublishing should be alternative to print in journal publishing (F) Problems in microfilming state and local government documents (F)	Impact of publishing a research journal in microfiche (Survey) Evaluation of publisher's descriptive information on works available in microform (Survey)
	Evaluation study of adequacy of sources (book dealers) used by university library

CREATION OF INFORMATION (2)

Research/Knowledge (Library Profession)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Need for research in information science (F) Need to build on previous library research (F) UK national research programs in information science (F) International research and development in documentation (F) Library research for practicing librarians (F)	Library research--past, present, future (Field Survey of State Librarians) (U.K.) History of research at Sheffield in library science with a general review of research areas in library and information science (Literature Review) (U.K.) Trends in research and development in documentation (Canada & U.S.) Scientific research in library schools--history and future (Literature Review) (U.K.) Public library research projects since 1960 Research in librarianship: funding sources, locations, purposes (Survey and Literature Review) Design for evaluation of information science research Evaluation of manuscripts in health sciences librarianship to identify problems in research design, data presentation, and writing skills (Dissertation)
Selection of journals for publishing library research (F) Guide to bibliometrics and its relevance to practical library and information problems (F)	Bibliometric study of two selected journals in library science, 1970-1974
Publishing ideas by librarians for improving practices (L) Column to begin on reviews of PhD dissertations in library and information science research (N)	Impact of research publications on librarianship--on practitioners and on the knowledge base of librarianship Correlation of individual and organizational research and publication productivity among university and college librarians (Dissertation)
	(U.K.) Computer simulation as a research tool for information science Use of sociological approach in library research

CREATION OF INFORMATION (3)

Research/Knowledge (Library Profession) (cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
NSF considers demoting DIST (N)	
NEH grant to study rural librarianship (N)	

CREATION OF INFORMATION (4)

Research/Knowledge (Other Disciplines)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Decisionmaking re funding of high-risk approaches to research (L)	
	Annual reviews as indicators of developing structures of scientific disciplines (Dissertation) Investigation into the structural properties of information in different subject areas
The information deficit may be equal to or greater than the information surplus: how much information evaporates before being captured? what is value of it? cost of capturing? (F)	
Role of libraries in the diffusion of knowledge (F)	
	Relationship between perspective-taking and communication strategies within rational emotive therapy (Dissertation)
	Effects of metainformation cost change and metainformation preference in a decision task (Dissertation)
	Proposal to use a new index to determine the dispersion or scatter of documents over some set of values of a document

ORGANIZATION OF INFORMATION

Management of

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
A total system for technical services (F) Introduction to library technical services (B)	
Serials management and microforms (B) Administration of periodicals (B) Managing report collections for zero growth (F) Weeding techniques (F) Calculations for half-life of chemical literature (L) Use-density measures for journal retention/disposal (L)	Review of the literature about serials (Literature Review) Use of reciprocal interdependence as method for handling serials in manual and automated systems (Case Study) Costs and benefits of purchasing periodicals on one-year versus three-year subscriptions Method for determining journal retention/disposal based on costs, shelf-space, and user needs Quantitative model of aging of scientific journals through citation analysis Methodology for testing use of biomedical journals to determine obsolescence and manage shelf space Subsequent demand (in medical library) for journal titles weeded in 1975 shows decisions were wrong (Case Study)
IRS rulings re publisher warehouses vs. library needs for items to stay in print (F) Price index of medical periodicals (L) Use of wholesalers vs. publishers (L) Implementation of exchange program to meet budget curtailment problems (F) Collection size/budget of children's hospital libraries (L)	Prices and U.S. periodicals Effects of inflation on cost of journals for small hospital libraries (Survey) Study of acquisitions and processing costs in a small public library (comparison of utility vs. in-house)
Library bindings--no standards; over-charges (L)	
	Comparative costs in storing materials Shelving practices in libraries (Experiment) Costs of compact shelving vs. microfilming

ORGANIZATION OF INFORMATION (2)

Management of (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Organizing a picture postcard collection (F)	
Local government records: management, preservation, and use	

ORGANIZATION OF INFORMATION (3)

Collection Development/Acquisitions/Selection

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Collection development in: gifts and exchanges (B) sound recordings (B) vertical files (B) slide libraries (B) government document collections in health-science libraries (B) government publications (B) Public library responsibility to develop quality collections (B) Quality vs. what people want in public libraries (L) Place of romance novels in libraries (F) Archival responsibilities of university libraries (F)	Application of information theory for materials selection and collection evaluation (Dissertation) (U.K.) Computerized method correlating circulation and inventory statistics for collection development of monographs in a large research library (Experiment) Test of Lopez method for evaluating collections of university and research libraries Evaluation of collection development procedures in 19 ARL libraries (Survey) Collection evaluation in research libraries (problems, issues, & methodologies) (Literature Review) Collection development in university libraries: relationship between categories of selectors and usage of selected items (Dissertation) Study to find out which university libraries are collecting significant business archives (Survey) Evaluation/analysis of collection development at NLM Potential of bibliometric analysis in literature of arts and humanities for collection management
Difficulties and constraints in selection of books (N)(F) Selection of materials for interdisciplinary university programs, not just specific subject areas (F) Selection for self-educated minorities, not just middle-class public library users (L) Selection of books/journals for small dental library (F) Need for critiques, not reviews of children's books (L)	Model based on cost-benefit ratio for selection of journals Objective method for selecting serials on a small academic health science library (U.K.) Analysis of ILL for journal acquisitions Online acquisition systems are effective management information tool for university library administrators (Survey) History and future of sales of non-print media to U.S. schools (K-12) (Literature Review)

ORGANIZATION OF INFORMATION (4)

Collection Development/Acquisitions/Selection (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Lack of access to local municipal publications (F) Obtaining access to federal documents under FOI Act (F)	

ORGANIZATION OF INFORMATION (5)

Document Representation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Model classification principles (B)	(U.K.) Theory of integrative levels and relevance to design of classification schemes Use of titles for automatic document classification (Experiment)
LC subject headings: principles and applications (B) AACR2: problems, implications, description (N)(L)(F) Cataloging of the corporate entry: problem of relationship between corporate bodies--can automation (authority files) help? DDC19: problems; adoption (N)(L) Cataloging needs of public libraries (N) Serials cataloging (B) Problems in discography (F) Film cataloging (B)	Review of work about descriptive cataloging, 1979 (Literature Review) Review of works on subject analysis, 1979 (Literature Review) Performance of card catalogs--a review of research (Literature Review) AACR2: History and implications of implementation (Literature Review) Investigation of corporate headings with form subheadings and without subheadings (Dissertation) Relationship of the length of the catalog field to the accuracy with which it conveys the contents of the document it represents (Experiment) Handling of corporate authorship in descriptive cataloging (Dissertation) Analytical approach for studying corporate entry in cataloging (Dissertation) Survey of practices and expectations in name authority work on OCLC libraries (Dissertation) Adequacy of LCSH for Black literature resources Standards in structuring subject headings for art libraries (Experiment) Conversion from SEARS to LC (Experiment)
Indexing concepts and methods (B) Need for filing rules from a user's point of view (F) Indexing of legal books (F) Citation indexing applied to sciences, technology, and humanities (B)	Comparison of provenance and content indexing methods for subject retrieval in archives (Dissertation) Automatic indexing based on transition phenomena of word occurrences Test of the hypothesis that citation indexes work (Experiment)

ORGANIZATION OF INFORMATION (6)

Document Representation (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	Tests of citation indexes for validity Investigation of fuzzy set theory as appropriate formalism for models of searching & subject indexing Comparison of the success of user-assigned index terms vs. index terms assigned from a thesaurus (Experiment)
	Quantitative approach to studying dynamics of a thesaurus (Dissertation) Identification of new lexical-semantic relationships and their properties for use in structuring thesauri
	Analysis of proportion of information in author abstracts that comes from different parts of research papers
	Role of authors in providing information for bibliographic control of their works (Survey)
	Cybernetics of bibliographic control--a theory of document retrieval systems

ORGANIZATION OF INFORMATION (7)

Automation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Introduction to OCLC (B) Description of RLIN (F) Introduction to WLN (F)(F) Comparison of bibliographic utilities (BB) Go it alone decision, vs. use of biblio utilities (N) Library builds online MARC database (F-L)	Potential of (bibliographic utilities) for a special library (Case Study)
Closing the card catalog (L) Card vs. online catalog: management issues and decisions (B)	Experiments in layout of library catalog information on COM Method for estimating number of public terminals needed for online catalog (or MF readers for COM catalog) Development of generalized algorithm to determine terminal requirements for online catalogs
KWOC vs. automated indexing (L) Potential of computers for indexing popular fiction, including comics (F)	Automatic extracting of texts in several languages for automated systems
Automation of technical services in research libraries: toward a paperless society (F)	
	Design of system for matching and controlling author names (Experiment)
Online serials management system in a special library (F)	
	Thesaurus generation via automatic term clustering (Experiment)

ORGANIZATION OF INFORMATION (8)

Preservation/Conservation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Preservation of library materials (B) Preservation of materials at a crisis (F) Policy statement on conservation for research libraries (F) Need for inhouse preservation (repair) capabilities in research libraries (F) Preservation and restoration of sound recordings (B) Foundation gives grant for preservation of U.S. doc. research collection (F) White-light processing technique, for archival storage of color films (F) Microform copies of rare archival materials as substitutes for preservation of originals (F)	Report on national needs in libraries and archives conservation (Survey) Review of collection development and preservation in 1979 (Literature Review) Microbiodegration of audiovisual collections --films, tapes, photos (Experiment)

ORGANIZATION OF INFORMATION (9)

Other

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Problems in organizing/retrieving machine-readable data archives (F-L)	Application of cataloging rules to machine-readable data files
Use and production of microfilm (F-L)	Converting from hardcopy to microfilm (Experiment) Study to improve bibliographic access to microform monographs (Survey) Access to microforms--lack of adequate cataloging rules and bibliographic control (Literature Review)
Needs assessment in a government library for cataloging of data (F)	
Bibliographic control of early books (B)	
Analysis of union list of serials (B)	

DISSEMINATION OF INFORMATION

Library Services (General)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Reference service (BB) Staffing the reference desk: professionals vs. non-professionals, and reference librarians vs. other librarians (F) Role of teaching in reference services (F) Review of academic reference services for the publications of municipal, state and federal government (F)	Search and idea tactics to improve information searching strategies Effectiveness of telephone reference/ information services in academic libraries (Dissertation) Unit costs of reference questions using random time sampling and self observations, in a medical library (Experiment) Role of the "referral slip" in improving the referral service among the libraries of a state university (Experiment) Need for an information desk in a research library that provides decentralized reference service (Case Study) Analysis of public library reference questions by analyzing the user's reasons for asking the question to improve the effectiveness of the reference interview (Survey)
Dissemination (FF) Review of state dissemination activities in 3 states (F)	International information flow, using physics data for test
Aspects of a successful microfiche program (F)	Relation of microform instruction program to user acceptance (Dissertation) Portable microfiche readers part of successful program
College learning resource center (B)	Analysis of learning resources centers in 2-yr. academic institutions (Dissertation)
Role of microform government publications in providing sociological and historical information (F)	
	Measurement of circulation desk activities using a random alarm mechanism (Experiment) Document delivery services in university & college libraries need improvement (Survey)

DISSEMINATION OF INFORMATION (2)

Targeted Library Services

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Consumer health information services (U.K. viewpoint) (F)	Role of library in delivery of consumer health information (Survey)
Library service to older Americans (N)(F)	Evolution of public library services for the adult independent learner (Dissertation) Adult education programs and activities provided by public libraries in (state) (Dissertation)
Emerging patterns of community services (B)	Trial service to local government decision-makers by library school--program discontinued (Experiment)
Puppet shows for the young, to teach about physically/mentally disabled (N) Library service for institutionalized individuals (F) Library service in prison (N) Provision of TV booths for hearing-impaired to view captioned programs (N) Library service for the disabled (mainstreaming) (B)(N)	Economic and other aspects of telebook services, for delivery of recorded books electronically to blind and physically handicapped individuals (Experiment) Model library services for hearing-impaired individuals (Survey) Model library programs for disabled, institutionalized individuals (Demonstration Project)
Library services for children (BB) Library services to children: parents vs. children's rights (F) Role of the library in controversy of "value education" (K-6)(F) Role of public library in reaching non-readers (K-12)(F)	Review of public library programs for young (preschool) children (Literature Review) Research and measurement in library services to children (Belgium) Techniques for presenting TV news to the deaf Research and measurement in library services to children Use of computer-based systems to increase information access of school-media center materials (Demonstration Project) Pilot project for library services in story-telling for 2-year-olds Styles and techniques of evaluation applicable to early childhood library programming in public and school libraries (Demonstration Project)

DISSEMINATION OF INFORMATION (3)

Targeted Library Services (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	(Canada) Research and measurement in library services for children
Clinical librarians and services to patients (L)(F) Medical libraries as resource to hospitals for online searches (for a fee) (F) Support for continuing education needs of health practitioners (L) Programs for community hospitals (L) Service to in-service nurses (L)	
Bookmobiles still needed; still effective (L)	
More attention needed to needs of special groups (L) Should libraries help to fight illiteracy? (N)	Services to Spanish-speaking population (Survey) Application of computer technology to development of planning information systems for native Americans (Experiment)
Failures in social experimentation; need to return to traditional library services (L)	

DISSEMINATION OF INFORMATION (4)

Roles of Libraries

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Role of public libraries in the electronic evolution, to increase access (F) Purpose of the public library (F) The public library in perspective (B) Role of humanities in public libraries (B) Role of public libraries in adult literacy education (F) Role of public libraries in implementing PL 94-142, education of all handicapped children (F)	Role of public libraries in adult education (Literature Review)
Role of librarians in bibliotherapy; need for training (F)	Bibliotherapy: development of profiles of bibliotherapists (Survey)
Role of library in imparting both knowledge and information (F)	Critical look at prevailing assumptions concerning relation between libraries and societies
Characterizing special libraries by industry	
	Perceptions of students, teachers, principals and media specialists toward school library media center program and services (Dissertation)
	Role of libraries and formal information centers in the dissemination of research results (Literature Review)
	The use of student book collection contests at colleges and universities to develop and strengthen a positive attitude toward books and libraries (Survey)

DISSEMINATION OF INFORMATION (5)

Inter-Library Loan (ILL)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Need for more rational economic basis for ILL (F)	Evaluation of experimental ILL system (Experiment)
Economics of union catalog index development (F)	Turnaround times in evaluating ILL services: US mail vs. UPS (Survey)
Cooperation in ILL/journal holdings system (F)	
Comparison of ILL through OCLC and a state system (N)	
Use of teletypes for improved linkages (F)	

DISSEMINATION OF INFORMATION (6)

System Design and Evaluation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
The DOD System (F) MEDLINE (F) Scientific and technical online databases (F) Update on bibliographic databases available online (F)	Evaluation measures and methods for online bibliographic systems Comparison of three legal online systems Cost-benefit analysis of selected environmental and data information systems Investigation of online searching of ERIC and recommendations for re-design Limits in subject retrieval from a large published index (Dissertation) Evaluation studies on a textile information retrieval system (Dissertation) User features of an inhouse information system based on automatic indexing, compared to commercial online service (Experiment)
Presentation of bibliographic information on PRESTEL (F) Emergence of systems designed to supply information for the entire population (F) Systems for "everyday" information (F) Problems in public access to library automation(F)	Experimental online catalog (for public access) at a university Design of intermediary system for use of online systems by end users (Experiment) Design of user-computer interfaces suitable for end-user access of information systems (Literature Review) Evaluation of retrieval from book indexes Developing corporate author serarch keys for online catalogs (Experiment)
Feasibility of full-text retrieval for the sciences (B) Automated system for referrals to community agencies (B) System for handling and retrieving local and state economic data (F) Differences in systems for the arts and humanities vs. sciences (F)	Experiments in relevance weighting of search terms (Multiple Studies Reported) Search term relevance weighting given little relevance information (Experiment) Analysis of optimal depth of indexing for designing information retrieval systems Selected artificial intelligence techniques in information retrieval systems research (Dissertation) (Literature Review) Analysis of man-computer interactions Data organizational techniques underlying pattern recognition systems (Dissertation)

DISSEMINATION OF INFORMATION (7)

System Design and Evaluation (cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	(U.K.) Study institute to increase knowledge on design of information systems (U.K.) Document retrieval experiments using indexing vocabularies of various sizes, hashing, truncation, etc. Design and evaluation methodology for information systems Simulation model for information system design and evaluation Use of co-citation and bibliographic coupling in document retrieval Using Boolean queries with clustered file organization (Experiment) Information retreival and analysis system as an inquiry interface (Dissertation) Construction of software tools to aid online decision makers and database users in accessing information relevant to their needs
Future trends in database software (F)	Automatic merging of monographic databases and the identification of duplicate records Computer programs for development of data selection criteria and generation of a database (Experiment) Feasibility study to examine modeling database storage, maintenance and update operation Compression technique for storing natural language text (Experiment) Design concepts and technques for the online representation and organization of knowledge; its use, transfer, and extension (Experiment)

DISSEMINATION OF INFORMATION (8)

Management and Evaluation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Measurement of library services (B) State program for measurement and evaluation of reference services in public libraries (F)	Evaluation of open book stacks and academic library performance, including circulation, use, and availability (Experiment) Correlation of classes of books circulated and those used within an open stack library Impact of computerized circulation system on performance in large college library (Experiment) A queuing theory (Bayesian model) for the circulation of books in a library Evaluation of audiovisual (educational media) agencies, materials, and equipment in public schools (Dissertation) Ability of catalog information to indicate relevance of documents (Experiment) Impact of computerized circulation system on performance in large college library (Experiment)
Comparison of costs of different current awareness methods, including SDI and verbal communication (F)	
Marketing and promoting online services by librarians (F)	
Administration of microforms in college libraries: use must be encouraged (F)	
Selection of an online vendor (F)	
Comparison of alternative systems for providing access to the periodical literature (B)	
	Automation and the service environment of the circulation manager (Dissertation) Effect on photocopying of limiting journal circulation

DISSEMINATION OF INFORMATION (9)

Management and Evaluation (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	Current vs. new way of handling scientific and technical information (Survey)

DISSEMINATION OF INFORMATION (10)

Online Search Services in Libraries/Information Centers

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Use of online vendors for searching chemical literature (L) Implementation of online search services at a federal government library (F)	Opinions and needs of online database searchers in special libraries (Survey) (U.K.) Comparative study of two databases for a current awareness service (Experiment) Description (and analysis of potential use in libraries) of non-bibliographic online database services (Survey)
Problems in formulating effective online strategies: obtaining clear definition of problem from researcher (F)	Impact of free-text vs. controlled-vocabulary searching on ERIC (Experiment) Testing and evaluation of searching procedures with online systems (BB) Effect of searching environment on online searching performance (Case Study) Overcoming biases in retrieval strategies
Use of 1200-baud access in information retrieval (L)(F) Use of slaved terminals to serve remote locations (L)	Use of thermal image film for demonstrating online searching (Experiment)
Free online searching at a university library (L)	Study of user-identified costs and benefits of online searchers (Survey) Evaluation of costs of online search services in a medical library Trial use of free computer-assisted service in a public library (Experiment) Introduction of free online searches to chemists (Experiment)
	Impact of online searching on ILL in a special library (Experiment)

DISSEMINATION OF INFORMATION (11)

Other Automation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Growth of medical information systems in the U.S. (B)	
Difficulties in automating archival records (F)	
Locally developed automated circulation system made available to other libraries (N) OCLC drops circulation development contract (N)	
Use of automation for generating new accessions listings (F) Use of computerized literature searches to produce faculty publications lists (L)	
Tutorial on machine translation vs. machine-aided translation (F)	

DISSEMINATION OF INFORMATION (12)

Professional Communications

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Communication of research: from researcher to user (F)	Communication of educational research and development (Dissertation)
Discussion of NSF-supported projects in the area of electronic alternatives to paper-based communications (F)	Integrated electronic communication system
	Methods of transmitting research report data from the laboratory to end user in corporate setting (Survey)
	Information acquisition, use, and transfer in an R&D lab and between the lab and other corporate divisions (Experiment)
	Communicating results of NLM grant-supported library projects (Survey)
	Study of grant-related communication activity to explore information exchange in health sciences (Survey)
	Construction of knowledge transfer functions (Dissertation)
	Authorship study in 5 library periodicals--professional communication among librarians

USE OF INFORMATION

Users and Uses

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Access to libraries (B) Improvement of libraries should be based on identification and understanding of problems that they are intended to solve (F) Need to consult users in development of systems: only successful way is through performance measurement of users and uses (F) Need for research on user attitudes toward systems and paying for information (F) Who are the information rich--decision-makers or the people they rely on in organizations? (F)	Management-oriented model for studying and describing user information behavior Problems of measurement and interpretation of library collection use studies (Literature Review) A methodology for needs assessment for information and referral services (Case Study) Use of tools for bibliographic access and success rates (Survey)
Controversy over implications of recent library use studies at a university library (F) The public library as a source of information for community groups (B) Information needs of business (F) Use of libraries by handicapped individuals (F) Information needs in the humanities (B) Research on information needs in a gerontological program (F) How to find chemical information (B)	Communication apprehension and the acquisition of information in the academic library (Dissertation) Citation analysis to measure how academics and practitioners in computer science differ in use of published information Application of conjoint analysis (from marketing) to measure student preferences (in colleges and universities) for reference services (Survey) Regular and irregular library use by faculty members at three universities (Dissertation) Profile of users of a university library (Survey) Study of who uses university map collections Use of negative binomial distribution to establish patterns of book use in academic libraries Study of search techniques of experienced information specialists, chemistry faculty, and novice searchers (Experiment) and Determine whether online prompting improves searches of three groups

USE OF INFORMATION (2)

Users and Uses (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	Use of online chemical databases by chemists in a university and private company (Experiment) Theories of middle range on information use by scientists and engineers in formal information systems User needs study in (special library) (Survey) Comparison of requested literature vs. cited literature by scientists Assessing needs of the Spanish-speaking (Survey) Measurement of user's perceived value of information analysis center Information needs of practicing physicians (Survey) Professional's (lawyer's) attitudes toward online retrieval systems (Survey) Clients and uses of SDI services (Dissertation) Identification of measures to discriminate among users of online retrieval systems with different levels and types of experience (Dissertation) Study of reading and book buying habits of the American public (Survey) Life and reading interests of adult users of public libraries in communities of various sizes (Dissertation) Library use and characteristics of library users at public libraries in (state) (Survey)
Study of online public access to catalogs (N)	Identification of patterns of human interaction with card and online catalogs in university libraries (Survey) Development of measures for library use with emphasis on card catalog and online catalog use in university libraries Patron use of an online circulation system in known-item searching (Experiment)

USE OF INFORMATION (3)

Users and Uses (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Complaints/comments about COM by users (F)	
	Use of thesis information as an information tool (Survey)

USE OF INFORMATION (4)

Of Libraries and Information In Research

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Importance of research libraries to American intellectual life (F) Use of information to improve productivity (F)	Effective use of scientific and technical information in industry (Experiment) Method of literature analysis applicable to science management (Dissertation) Use of online systems, particularly citation analysis, for scientific planning and evaluation (Experiment) New approach for gleaning correlative and statistical information from patent literature Bibliometric analysis of patent literature and its relationship to the scientific journal literature (Dissertation) Use of bibliometrics as a technique to cluster professors for interdisciplinary relatedness
Future of research libraries (B) Use of libraries (book collections; archives) in scholarly research (FF) Changing patterns in academic research (L) The implications for the library of the humanistic scholar (F)	How much and what kind of prior research is needed and wanted by researchers (Literature Review)(Exaggeration prevalent of amount of access needed for original research) (U.K.) Bibliographical and information content of research papers (Survey) Use of citations in literary research Citation analysis in the arts and humanities Comparison of peer assessment of the influence of articles vs. citation assessment for scientific journals (Survey) Study using citation analysis, of the interrelations of psychology literature as a preparatory step for studies of psychological research activity Characteristics of references in selected English literary journals
Use of government publications by social scientists (B) Social science research depends on use of machine-readable data files, so librarians must become aware of them and deal with them (F)	

USE OF INFORMATION (5)

Of Libraries and Information In Research (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	Value of patent information services to the researchers and impact on R&D (Case Study)
	Evaluation of ERIC serarch strategy for locating information on use of online systems in libraries
	Method for partitioning citation databases into clusters of related journals Comparison of peer assessment of the influence of articles vs. citation assessment for scientific journals (Survey) Bibliometric evaluation of the information analysis concept (Dissertation) Nature and degree of human error in data gathered by sociometric techniques from information networks Use of online databases for bibliometric studies (Experiment)

USE OF INFORMATION (6)

Communication

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Scholarly communication (BB) Value of person-to-person networks via teleconferencing (F)	Communication behavior patterns of academic educators and affect on information processing (Dissertation) Analysis of communication-support system for dissemination of scientific and technical information in development of (state) public policy (Dissertation) Application of computer networks in information science research (Literature Review) Impact of a computerized conferencing system upon scientific research specialties Use of cable TV to communicate among members of an organization (Demonstration Project) Study of the impacts of a formal computer-based information system on informal information networks among engineers

USE OF INFORMATION (7)

Library/Information-Use Instruction

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Need for study in user education (F) Review of library instruction at all levels: educating the user (L) Techniques and strategies (FF)	100-year history of library's role in user education (Literature Review) Model of "library learning," to identify distinct contributions to learning Need for evaluation of bibliographic education (Literature Review) Review of issues in bibliographic instruction (Literature Review) Structuring services and facilities for library instruction (Literature Review)
Library-use instruction (schools) (L)	Adult reading behaviors and ego-stage development (Dissertation) (Canada) Teaching research skills (use of library) to patrons of a public library (Survey)
Library-use instruction (academic) (FF)(LL) Teaching sociology students bibliographic methods for document research (F) New approach to library instruction in psychology, using natural structure of the research literature (F)	Review of college library instruction (Literature Review) Study of (campuses) offering undergraduate credit courses in library instruction (Survey) Applying aptitude treatment interaction for individualized instruction in using "The Reader's Guide" (Dissertation) Comparison of three methods for teaching library skills in conjunction with Freshman English (Dissertation) Critical incidents and contexts in assisted adult library learning (Dissertation) Comparison of lecture and programmed instruction in teaching basic catalog card bibliographic information (Dissertation) Effect of CAI library skills strategy on attitude toward and use of college library (Dissertation) Administering course-related library instruction programs in selected academic libraries (Dissertation)

USE OF INFORMATION (8)

Library/Information-Use Instruction (Cont.)

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
	Comparative effectiveness of slide-tape show and library tour for library instruction Need identified to relate library instruction to research required in student's courses Study of university library patron's needs (Dissertation) Funding to achieve greater integration of academic libraries and undergraduate education (Dissertation) Relationship of students (in 2-yr. college) library skills to their use of the library (Dissertation)
Continuing education for clinicians in retrieval techniques (L) Design and implementation of a law school orientation program for WESTLAW (F)	
Teaching social workers to use information technology to help solve casework problems (N)	

MANAGEMENT OF LIBRARY & INFORMATION SERVICES

Planning and Evaluation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Designing libraries to sell services (F) Approaches to measuring library effectiveness (FF) Library effectiveness for the next decade (B)	Public library planning New approach to the evaluation of public libraries (Dissertation) Measuring library effectiveness User-oriented approach to setting priorities for special library services (Survey) Evaluation of clinical medical library program Study of new special libraries and means to encourage their formation (Survey)
Planning a branch library (F) Interior design for libraries (BB) Libraries designed for users (BB) Survey of library-constitution needs planned (N)	Contingency theory and implications of use in designing structure of an academic library Application of several environmental design factors to planning of public library facilities (Dissertation)
Study of elected library managers planned (N)	Development of an instrument for measuring public librarians' perceptions of their organizational climate (Dissertation)
Quality assurance in health science libraries (L)	
Use of suggestion cards (L)	

MANAGEMENT OF LIBRARY & INFORMATION SERVICES (2)

Administration

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Library management studies--not enough evaluation (F) Studies in library management and organizational development (BB) Information for academic library decision-making and administration (BB) Benefits of implementing a management information system (F) Need for both qualitative and quantitative analysis in decisionmaking Changes in academic environment--fewer full-time/on-site students--means changes needed in academic libraries, in library-use aids, and instruction and in library services (F) College and research librarians must become budgeters, systems managers, and conflict resolvers--to manage technologically elaborate libraries (F) Placement of company into unit in organizational structure important for it to work at maximum efficiency (F) Problem with present library administrative structures and negative effects on professional libraries Management problems with multi-site libraries (F) Supervision of library employees (B)	Goal displacement in academic libraries as related to selected organizational factors and characteristics of individual employees (Dissertation) Effect of library director's theory of management on middle management behavior in medium-size public libraries (Dissertation) Comparison of perceptions of deans, library directors, and department chairmen to actual and ideal role of library directors, in a 2-year institution (Dissertation) Analysis of decisionmaking processes in public libraries (Dissertation) Application of operations research in libraries and why it is an underutilized technique (Literature Review) Experimental design for restructuring and redesigning functions of academic research libraries (Dissertation) Governance and academic libraries, related to the academic setting (Literature Review) Psycho-organizational approach to staff communication in libraries Leadership, organizational dynamics, and rate of change in selected public libraries (Dissertation)
Information resources management: definitions (F) Management of libraries: getting corporate management support (F)	
	Hospital library resources and services (Survey)
Marketing/promoting the library (F)	(U.K.) Direct mail advertising and public library use (Experiment)
Library managers' guide to automation (B)	

MANAGEMENT OF LIBRARY & INFORMATION SERVICES (3)

Budgeting/Costs/Fees

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Zero-base budgeting in a university library (F) Cutting library costs (BB) Case Study: fiscal concerns and unpopular choices (F)	Budgeting in academic private libraries (Case Study) An analysis of costs of public library operations Use of operations research to planning and budgeting for school media programs at building, district, and regional levels Functional relationship between levels of output and cost of operation in scientific and technical libraries (Survey)
	Factors affecting salaries of academic librarians in medium-size, state-supported universities (Dissertation)
Library costs and options: bookstock/ storage vs. ILL (F)	
	Trends and practices in user fees in publicly funded libraries (Literature Review) Statistical study of issues associated with fees and users of information (Dissertation)

NETWORKING AND COOPERATION/RESOURCE SHARING

Role/Structure/Governance

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
History of library networks and resource sharing (F) Library network development and impact on academic libraries (F) Critical issues in development of library cooperation (B)	Study of library cooperation, network, and demonstration projects (B) Study of library cooperatives (Case Studies) Exploration of library networking in remote, disadvantaged area (Experiment and Survey) Evaluation of interlibrary cooperation in (states) (Dissertation)
Structure/governance of library networks (B) Role of research libraries in the governance structure of a national bibliographic network (F) Planning for national governance of a nationwide bibliographic system (F) Complexity of library networks and their governance (F) Legal aspects of organizing a library network (F)	Application of game theory to library networks
Role of networks in generating management information of use to library administrators (F)	Strategy for managing journal collection of a resource-sharing consortium Forecasting demands for library network services
Libraries (states) establish cooperative for research sharing (NN)(F) State plans statewide medical services (N) Consortia switches from external funding to internal support (L) Bibliographic utility's membership is up; so are prices (N)	

NETWORKING AND COOPERATION/RESOURCE SHARING (2)

Multinetworking and Multi-Network Coordination

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Linkages called for between bibliographic utilities (N) Need for coordination among networks as decentralization grows (FF) Study awarded to investigate feasibility of linkages between bibliographic utilities (N) Local network and OCLC not competitive--cooperation and coordination needed (L) Commercial vendor announces interface with bibliographic utility (N) Total information network not feasible in our lifetime (L) Research needed to study library technologies conducive to efficient operation of national library/information network (N)	Planning model for linking bibliographic utilities

AUTOMATION AND TECHNOLOGY

Microforms

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
The microform revolution (BB) Economics of microfilming (F) Micrographics: use primarily in science and technology (L) Micrographics: need for system design in library before purchasing hardware (F)	Review of micrographics, reprography, and graphic communications (Literature Review)
	Online microfiche catalogs in libraries using microcomputers and centralized computers (Demonstration Project)

AUTOMATION AND TECHNOLOGY (2)

Automation

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Attempts made to show that machine intelligence is not the same as "man's" intelligence (F)	
	Methodologies for information system design (Literature Review)
Elementary school student develops cataloging and circulation system for library on WANG computer (N) Failures in library automation: dearth of articles on the demise of systems (F)	State of the Art on library automation (Literature Review) Evaluation approach to measure effect of automation on library staff productivity
Implications of online for publishing, library management, and library education (L)	
	Implementation of complex information systems (Case Studies)

AUTOMATION AND TECHNOLOGY (3)

Technologies

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Minicomputers in libraries (B) Role of microcomputers in libraries (F) Errors pointed out in microcomputer article (LL)	
Promising technologies for the library of the 80s: (F) satellite data communication for retrieval and document delivery (F) home delivery systems (F) personal computers (FF) online full-text retrieval (F) The videodisk revolution: use in libraries (B) Video in libraries (B) Fiber optics (F) Electronic delivery of documents and graphics (B) Use of holography as storage device and as aid in character recognition (F)	State of the art on telecommunication technologies and interfaces with transmission-dependent systems (Literature Review) Dynamic behavior of shortest-path routing algorithms for communication networks Studies on computerized conferencing (Experiments) Libraries experimenting with television and facsimile equipment for document delivery Telefacsimile as a document-transfer tool (Demonstration Project) Experiments using satellites to provide library services Integrated approach to planning international data communication systems (Dissertation)
Legibility research needed for new products, e.g., CRTs vs. printed word (F)	
Use of Kurzweil reading machine (F) Need for coordination (to achieve compatibility) among groups developing hardware for the disabled (F)	

PROFESSIONALISM

The Profession and the Discipline

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Librarianship a profession? (F) Scholarship and librarianship (F) The profession and the professors: academic programs are lagging (F) Search for a scientific profession: library science education in the U.S. and Canada (B)	Policy study of intellectual freedom in librarianship (Literature Review) The antithetical relationship between librarianship and science as knowledge systems Theory of semiotics, communications technologies, and culture (Dissertation)
Basic issues confronting information science education and the field of information science (F) Scope of information science and studies in the field (F) Evolution and current state of information science (F) Guide to information science (B)	Linguistic investigation into the discipline of information science (Dissertation) Mathematical problems in the theory of measurement related to information concepts
Recurring library issues (B)	
Study to learn working definitions of "information" in use by professionals (L)	
Human relations in librarianship (B)	
Unionization of librarians (L)	
Ethics in information science (F)	
More book reviews needed on library tools (L)	
	Review of authorship in 5 library periodicals, for biases of sex and other variables

PROFESSIONALISM (2)

Professionals

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Symposium on the role of the academic librarian (F)	Requirements for academic librarians to publish (Survey) Development and consequences of faculty bargaining, unit certification, and contract negotiation on academic librarians (Dissertation) Managerial role concepts of middle managers in academic and public libraries (Dissertation)
Advances in medical librarianship (F) View of medical librarianship as a system (F)	
Legal librarians: problem of unauthorized practice of the law (F)	
Occupational standards for information resource managers (F)	
Research responsibilities of the school media supervisor (F)	Relationship between belief structures of school principals and media specialists related to role expectations for media specialists (Survey)
	National profiles of information professionals (Survey) Sex-role orientation of library school students (Survey)
	Paraprofessional library employees--roles and training (Literature Review)

PROFESSIONALISM (3)

Careers and Career Development

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Problems and solutions to staff turnover in libraries (F) Why good people are leaving the profession (L) Status of university librarians (F) Library staff development guide (B)	Library organization variables and librarians' job satisfaction (Survey) Measurement of job satisfaction of community college librarians vs. college/ university librarians (Dissertation) Research on job satisfaction in libraries (Literature Reivew) Report on placements and salaries (Survey) Impact of increase in library doctorates; concern that administrators be hired on ability, not degree (Survey) Status of women in administration in health science libraries (Survey) Leave for professional development--help to gain faculty status (Experiment) Faculty status of academic librarians in (state) (Survey) Status of academic librarians found to be unequal to other faculty (Literature Review)
Resume essentials for the academic librarian (F) Poor classified ads for librarian positions (F) Expanding the job market for information professionals: what skills are needed? (F) Concern about library school graduates moving into non-library positions (F)	Design of the library director interview (Survey) Content analysis of ads for health science library positions to determine employers' desired qualifications
Emergence of a new specialty: the network librarian (F)	
Special librarianship (B)	
Personal experience as a free-lance librarian (F)	

PROFESSIONALISM (4)

Societies/Professional Associations

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Too many HOW WE DO IT HERE type articles (in professional journal) (L) ASIS role in formation of a government information policy (F) ASIS to track relevant legislation (F) SLA needs to be involved in legislative/political process (F) AIM (Association for Information Managers) vs. SLA: no real conflict (F) Issue of which organization is appropriate for map librarians (F)	Study of librarians who become officers in their organizations (Survey) Profile of ASIS members (Survey)

EDUCATION & TRAINING

General

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Training of librarians for library-use instruction (F)	
Training for computer-based reference services: whose responsibility? who should be trained? (F)	
Libraries and library schools at a crossroads; conditions for survival (F)	
Foundation expands professional education opportunities for libraries (N)	

EDUATION & TRAINING (2)

Academic Programs

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
New era of library services calls for new education (F) Library education accreditation: retreat from excellence (F) Two-year library/information science programs needed (LL) Need for library internships (L) Issues in recruitment of library school students (L)	Comparison of admission characteristics and performance of students in library school (Survey) Analysis of predictors of success in library school Apprenticeships and workshops as alternative to library school (F)
Research orientation needed in health sciences librarianship (F) What is being taught about research at (university) library school (F)	Analysis of library-field literature shows students in library schools need to learn more about statistics (Literature Review) (Canada) Introducing significant statistics component into library science research methods course
Programming language to teach computer usage to library school students (F) Teaching online information retrieval in library school (F) Total training program for online searching available at (library school) (N)	Evaluation of library school institution in online searching (Survey)
Education for health sciences librarianship (B)	
Integration of historical studies in archival curriculum of library schools (F)	
	Administrators' opinions on cataloging course content in library schools (Survey)
Clinical legal education for law librarians (fiscal issues) (F)	
	Study of audio-tutorial method for teaching basic reference work (Experiment)

EDUCATION & TRAINING (3)

Continuing Education

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Continuing education courses of (professional society) in automation doing well (N) A model continuing-education recognition system (B) (Professional group)'s continuing education program not the best way (L) Standard fees for (professional group)'s continuing education courses at national meetings established (L) Continuing education program of home-study and workshop courses developed for federal librarians (N)	Attitudes of librarians toward continuing education (Survey) Continuing education for library educators--practices, perceptions, and preferences (Dissertation)

PUBLIC POLICY/INFORMATION POLICY

Access to Information

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Access to information: issue of the 80s from the White House Conference on Library and Information Services (F) Conceptual framework for planning to alleviate information inequities (F)	
Choices in information-access policies influenced by government policies and technology (F) Telecommunication policy and information services: implications for equity of access (F)	Technical and legal issues in information privacy and data security (Literature Review) Social impact on different cultures of transborder data flow (Literature Review)
	Information equity in education

PUBLIC POLICY/INFORMATION POLICY (2)

Information Policies

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
(Need for) (Problems in development of) a national information policy (FF) COSLA OKs National Library Act (N) Publishers react positively, with some caveats, to NPC plans (L) National information policy from the research librarian's point of view (FF)(L) Relations between the private sector and the library and information services community (F) Discussion of LC's position paper on a national library and information network (F) Politics and information (F) Absence of a national information policy strains professional societies and publication programs, and distorts academic library acquisitions budgets: government should fund dissemination of information under federal research budgets (F)	Adaptive model of information policy (Dissertation) College librarians and a national information policy (Survey)

PUBLIC POLICY/INFORMATION POLICY (3)

Funding of Library Services

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Effects of national events on library funding and support (F)	Public finance approach to user fees in public libraries (Dissertation)
Funding of free public service in libraries--a decision for the public, not researchers (F)	Relationship between public relations activities and funds for public libraries in (state) (Survey)
Funding alternatives for libraries (B)	Relationship of sex of director and per capita support in large public libraries (Survey)
Public library funding (NN)	
Disagreement with editorial that support for research libraries is keeping pace with inflation (F)	
(State) legislation enacted for financing of public libraries (F)	

GOVERNMENT: PROGRAMS & SERVICES

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Role of government publications in a national program for library and information services (B) Obstacles in establishing a separate Patent and Trademark Office (N) Carter establishes task force on upgrading library services (N) Need for private information brokers, not more government services (L) NTIA examines foundations of domestic U.S. information policy (N) U.S. Post Office to offer electronic messaging service for large-volume users in 1982 (N)	
Review of LC activities and research, 1977 (F) Evaluation of NTIS as a clearinghouse of federally funded research	State of the art on information analysis centers: roles, staffing, funding fees, and services (Literature Review)
Study report: consolidation of ESEA IVB and IVC not working (N) Report on (state agency) library pilot projects (78-79)(F-E) Need for research on impact of library use of general fund monies from the 1972 Fiscal Assistance Act	Impact of Title II funds on public libraries (in State) (Dissertation) Problems facing state law libraries (Survey) Model for evaluating LSCA programs Impact of Higher Education Act, Title II-B, on minority recruitment in library and information science education (Dissertation) Rome Air Development Center information sciences study
Economic problems hit funding of presidential libraries (F)	

STANDARDS

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Suggestions for how academic libraries in (state) can meet university library standards (F) Problems with standards in the health sciences field (F) Potential role of state libraries in development of public library standards	Perceptions of 1972 library standards by president, academic deans, and learning resource administrators in a 2-year institution (Dissertation)

COPYRIGHT

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Protection for computer programs (F) Hearings on new copyright law (F) ACS announces "license to copy" experiment (N) Guide for educators and librarians (B) Interpreting copyright law for government publications (L) Publishers sue commercial photocopy house for copyright infringement (N) Problems with the new copyright laws (F)	Conference on copyright dilemma Copyright and information technology (Literature Review)

CENSORSHIP/INTELLECTUAL FREEDOM

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
A decade of censorship and on the increase (FF)(B)(N)	Review of research related to censorship in libraries (Literature Review)

THEFT

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
Theft (F)(N)	

FUTURES

PROBLEMS/ISSUES/TOPICS	RESEARCH/STUDY
New technologies and other factors place new demands on research libraries (F) Future of online retrieval dependent on technological developments, but also on funds and numerous other factors (F) Role of the librarian in a paperless society Impact of technological change on library jobs--management's role in redesigning them	Technology in libraries: 1960-2000 (Literature Review) Coping with new technologies Effect on work life of computer-mediated communication (Literature Review) Effect of online database systems on librarianship and library services
Information demand and supply for the 1980s (B)	Investigation of economic factors to estimate demand for library services Development of econometric model of demand by scientists for scientific and technical information services (Survey)
Environment for special libraries in the 1980s (F) Library services in business must change to match changes in business and information technology (F)	

APPENDIX B

SUMMARY OF IDEAS EXPRESSED IN CONVERSATIONS WITH "GATEKEEPERS"

Summaries of conversations with 21 Gatekeepers are presented in this Appendix. The ideas, concerns, and research needs expressed by the individuals have been grouped into major areas.

In parentheses after or within a paragraph, we indicate the number of Gatekeepers who expressed a concern in similar terms.

ORGANIZATION OF INFORMATION

A report from the Library of Congress on the National Union Catalog points to a research need in the area of variation in cataloging. Is it due to ambiguity in the presentation of the rules, e.g., in language and examples, or in the rules themselves? When interpretations are made, what are the reasons for differences in choices--education? experience? Do we need to draw up rules for the formulation of rules? (1)

Bibliographic utilities are focusing on technical services and cataloging support. But why not on reference service support, as well? What will it mean to have public access to an OCLC, in terms of the enormous number of hits that a user will get if he/she searches on "chemistry?" What are the implications for indexing? for natural-language searching? (2)

Research is needed into the psychology and linguistics of classification for applications in indexing and retrieval. (1)

We were admonished by Mortimer Taube in 1964, the year of the study that launched MARC, to take advantage of computerization to reassess our system and not to convert a 3x5 card into machine-readable form. We failed to question our basic premises. (1)

LIBRARY AND INFORMATION SERVICES

Recent studies have shown that reference services are likely to give a user the right answer no more than 50% of the time. Some suggest that this figure is acceptable, e.g., in the law, you have winners and losers. But, can a doctor afford to succeed only 50% of the time? Need followup on these studies to say why the success rate is no better. Do we need to develop a network of reference specialists? Issue is particularly relevant for the next decade, because networks will move from technical services to reference services. (2)

Feasibility studies are needed on the effective utilization of automation (not just for housekeeping tasks) within a school media program, to include requirements for staff development. Objective would be to make the center a more integral part of the instructional program. (1)

With the advent of the electronic transfer of information, the physical housing of materials is becoming irrelevant, and we will need to develop new concepts of service and new measures of effectiveness. But not all forms of improved service need to be based on the electronic medium--some forms can be derived from an improvement in our service orientation and some resourcefulness in using what is available. (1)

MANAGEMENT OF LIBRARY AND INFORMATION SERVICES

Need for models of costs and cost accounting. There are no accepted yardsticks that have been developed. And, what does it cost to use the library, in terms of the value of users' time, convenience factors, etc. Still no widely accepted method for putting a value (in dollars) on information. (1)

Need planning models to estimate consumer demand, so that local communities can apply the models, using demographics and other variables relevant to their own environment. (1) Also, need models for planning with a research orientation. (2)

What is the permanence of magnetic data in the context of archival considerations? What is the expected life of various media that are coming into use? Significant commitments have been made, and continue to be made, with computer-readable data, and if knowledge exists in other fields, e.g., in the social security administration or computer science, it needs to be learned and shared in our field. If not known, then research is sorely needed. (1)

What percentage of public library expenditures is going into public awareness activities, particularly when compared with the proportions spent in other non-profit and social service organizations? For example, how many libraries have full-time public relations officers? What kinds of techniques and methods for exposure are being used, and which ones are working? (1)

All libraries need more effective marketing programs. (1)

How do we manage change over the next decade? (1)

More is needed on measurement and evaluation of library services, including output measures. (3)

Need more sophisticated ways of managing information resources--not just techniques, but ways of thinking. For example, systems analysis is now out of favor, and operations research never came into favor. Why not? (1)

What is the process by which decisions are being made now in libraries, particularly in terms of their economic alternatives for allocating funds? (1)

USERS AND USES OF INFORMATION

Impact research on the use of information is needed, but with more realistic aims. For example, it should focus on the direct beneficiary of a system, service, or program, not on an ultimate once-removed beneficiary. For example, in the case of school media programs, measures of effectiveness should be made with the teacher, and not with the student. (1)

Need to teach intermediaries and end users to know what information is available and how to find it. (1)

Need to train people who normally do not use information on how to use. (1)

What is the size and character of the potential market for home-based, electronically delivered information services? (1)

We seem to think that what users request or demand is the same as what they need, but they are not synonymous and we need to learn more about that distinction. The decision on an appropriate level of service--whether a user is to be pointed to a tool, instructed in its use, or given an answer--should lie with that user. We are not really service-oriented and don't question our basic value systems. (2) Another example: is the catalog really a public-access tool? We have set up systems to support our own technical processing and system needs. (1)

Need to look at the kinds of information that people want and how they gather and use information, and then look at how libraries can rearrange their services to meet people's needs. (1)

Need for more research on the information-seeking behaviors of users from different disciplines, e.g., the humanist versus the scientist or engineer. (1)

Research is needed into the psychology of users as information seekers, processers, responders, and outputters. Research in past has studied the "whole population," e.g., through circulation in public libraries. Next, the move was made to studying sub-groups and the importance of social and demographic variables. Now studies are being done on the importance of the user's state of mind and on environmental variables (e.g., whether the boss approves or not). Need a basic model to study the individual in this information seeking/using context, sharing approaches from the behavioral disciplines. (2)

The profession educates individuals for particular jobs, e.g., to be a cataloger or reference librarian or, more recently, an academic library director or an information center manager. Have we done enough to think of the "user" as an appropriate field of study, to help us build a constituency in advance rather than thinking of them when they appear at the door of a particular institution? If we were to think of such a field of study, we would give attention to the training needed in our society to be information seekers and users. For example, when and how does one learn the concept of authorship? When and how does one learn that what is written is not always guaranteed to be accurate or correct? As information sources become more complex, individuals will need to be taught to deal with this complexity. (1)

Need to test the hypothesis that people don't really use information. To what extent do people shop around for information to support their decisions, and how do they use it? Information may not be as important as we think. (1)

What is the role of information in risk assessment, and in judging the acceptability of risk? (1)

Need to develop measurement techniques for determining the productivity of knowledge workers, defined as professional and managerial white-collar workers. We need to be able to quantify the "effectivity" of a knowledge worker and how it is improved through the use of information, e.g., databases. (Effectivity is used to mean productivity and effectiveness.) For example, of the total cost that is spent to support knowledge workers, only 4% is spent on information resources. In contrast, for clerical workers, 23% of the cost is spent on information resources, including word processing, electronic mail, etc. (1)

Need to look at the information needs of children and youth, to find out where they get their information and whether the sources of supply (libraries, schools, bookstores) are adequate. (1)

INFORMATION TECHNOLOGY AND SYSTEMS

Conceptually, how do we think about full-text storage and libraries? What are the systems and storage behind the concept? the economics? the impact? (1) and indexing? (1)

What will the role of public libraries be with respect to the emerging public information systems, such as The Source, Micronet, etc. And, what sociopolitical impacts will they have? (1)

Can we now design a practical way to develop fact-retrieval and question-answering systems? In the past, we have had blue-sky research, but technological advances now make it more realistic. (1)

More followup research on what has been done is needed in the linking of systems, to create a "transparent system," through an interface that provides for the automatic analysis of users, to route them appropriately, and to help them select databases and switch among systems. (3)

Need for aids to help users subset output from large databases, to make the output more manageable for decisionmaking. Some experimental work has been done, but on small files, and there is no funding support for scaling up these efforts to test them on large systems. (1)

Time is ripe again for support to linguistics, because of numerous advancements in computer sciences and systems. Also, in artificial intelligence. (1)

Need for new computer architectures (hardware) for information retrieval. This has never been attractive to the computer industry because of presumed low demand. Probably not true any longer. (1)

It makes no sense for the library field to put any money into telecommunications development. (2) It would be useful, however, to have some state-of-the-art studies to determine what's happening, how telecommunications technology is changing, and its economics. Also, some small amount of money could well be spent in trying out new services, with the proviso that the focus of the research be on the objectives of the service and not on the technology. One example is use of satellite technology to get more and better information into Indian reservations or remote and rural locations. (1)

We are suffering from a real generation gap in keyboards and a great void in both research and development about communication through keyboards. For example, we do not know what type of device is most acceptable and usable to whom. In a related area, we do not know much about the threshold of acceptability of various kinds of displays, and where along a continuum of image definition people will stop using or watching a CRT. (1)

Information and referral services cry out for automation. Starting up a basic information and referral service in a public library system is pretty straightforward and has been described in print. On the other hand, there is still a need to learn--and then tell others--how to do it with the help of computers. (1)

ECONOMICS OF INFORMATION AND PUBLIC LIBRARY SUPPORT

It is difficult to raise money for the type of services presently provided by public libraries. The problem is that we are having a technological revolution. The new means of information distribution are costly and the costs are sensitive to the amount of use. It is no longer easy to make a capital investment--e.g., in a building and books--and use this resource to provide needed services at low cost thereafter. The types of services that are coming into demand continue to cost money as they are used, so the traditional mechanisms of public library funding are in jeopardy. If libraries provide services that happen to satisfy user needs, they could be wiped out financially. That part of the problem is not very researchable. However, it does involve a number of challenges that will require understanding over the years. (1)

On a larger scale, our whole economic system is being undermined by new technology. Part of the cost for obtaining information is for the information itself; the other part is for the carriers of information--books, communications, etc. Even if information were to be treated as a free good--one that does not get used up as it is shared--one would still have to pay for the carriers, i.e., the packages. Perhaps it would be useful for libraries to conceptualize their services in these terms. (1)

There is a need to develop a better understanding about this change in our economic system, as it applies to information. One must think in terms of human capital, and one must think in terms of productivity issues. The free-enterprise system may allocate manufactured and other non-information goods well, but it may not allocate the other 50 percent of the goods well--and there is a need for society to share information. (1)

In terms of needed research, some first-rate economists who understand information should do some conceptual research on the economics of information, including alternative cost structures. One needs the kind of effort that is the conceptual equivalent of Fritz Machlup's work 15 years ago. (1)

There is also some possibility of doing research that involves intervention in the environment, e.g., on alternative economic incentives. At present, libraries have no feedback system. No one has tried anything like an "information stamps" program that would help to allocate library resources (computer terminal use, use of the copying machine, etc.) effectively and provide feedback on what services are most needed. (1)

Another type of research is statistics-gathering and observation on new information services and information-charging approaches (such as computer time versus information delivered, in the online systems). (1)

How should public libraries be financed? Will new services change the way in which they should be financed? (3)

Need to conceptualize responsibilities for the social cost of producing information. Although page charges are now a part of life for scientific and technical authors, there is still a basic assumption that "society" will take care of the rest of the process--bibliographic control and distribution of the information. Can present library funding support the rest of the process? What is the federal responsibility in this area, in an information society? (1)

INFORMATION POLICY

How can we change perceptions of both professionals and lay citizens concerning the importance of intellectual freedom in our society and in our libraries? (1)

Literacy in our nation is not the problem of libraries. Why are we asked to solve a problem that the education community has long been worried about and unable to solve? (1)

The problems of illiteracy do not have a home in academia; need to tie this area together with library services. (1)

PUBLISHING

The tradition of relationships and trust between publishers and librarians regarding the adequacy and accuracy of basic bibliographic information that is provided in print materials has been strong for a very long time. That same relationship and trust has not yet been transferred to the publishing of materials in new forms, e.g., cassettes. These publishers are repackaging basic works of information, sometimes in parts and pieces, and one cannot be sure whether a purchase represents some or all of the collection. Need something equivalent to a "title" page concept with these alternate publishing forms. This problem is of great concern in networking and resource sharing. (1)

What impacts will come in a paperless society? (1)

Various kinds of experiments need to be done on producing publications intended only for electronic distribution, as opposed to print form. These experiments are needed on journal materials, as well as reference materials. One needs to determine what difference it will make in how material is presented to the user electronically, the different ways in which one can deal with narrative presentations, and the implications of these differences. The economic implications of such experiments are quite significant. It might be cheaper for users to pay $2 for access to highly current encyclopedia material than to pay $200 for a set of books that sit on the shelf. But, to make it happen, we will need to meld the achievements of CAI with information techniques. (1)

The private sector may be missing the boat by not asking what kind of information lends itself to the electronic distribution medium. If it were used to show current prices from a catalog, and the printed remained to display and describe the products, then some realistic savings and benefits could be realized--to the producer/supplier and to the buyer. (1)

THE PROFESSION

Professionals

What kind of people are coming into the profession and what is their educational experience? Can we relate educational needs to the qualifications required for 21st-century librarianship? How much success is related to the individuals as compared to their educational experience? (1)

Need to define competencies for various library professional positions. In a recent survey (of a group of professionals), understanding of research or the ability to be an innovator were not among the top-named skills. Do we need to address ourselves to competency in the translation of research into practice? (1)

Are licensing and certification needed in our field? (2)

The assumption is made in library schools that individuals are being trained for traditional services, but networking and the new technologies require new knowledge and skills. How do we transition to a new educational concept? (2)

Faculty members are supposed to be leaders and innovators in a field, but in ours they are lagging. What continuing education and staff development efforts are needed? The library is not a static institution and, therefore, training and education must not be static. (1)

Fundamental questions need to be asked about what library and information science schools should teach. In the controversy on whether librarianship is a profession or a trade, we sometimes forget that library schools are being pressured, both by students and employers, to produce trained graduates. For example, there are strong pressures to teach a student how to search specifically on system "X," instead of teaching concepts and principles in information storage and retrieval. And, if we decide what it is that should be taught, can all library schools meet these goals? (1)

How do we bring about changes in librarianship so that the professional can act rather than react? (1)

How do we communicate professionally among ourselves? Are these communication patterns effective? (1)

More work is needed to distinguish between roles of professionals and paraprofessionals in our field. (2)

Too many public librarians have rejected involvement in information and referral services (because they smack of social service and advocacy). Yet librarians are the best equipped to respond to the full spectrum of "everyday" needs for information. How can we get librarians to take the necessary steps to expand their range of services to the public? (1)

The Institutions

How can we de-institutionalize the library and focus on the librarian as a consultant--a source of expertise on materials that are not necessarily physically present? For example, how might a "roving librarian" establish a clientele? What would be the relationship between the librarian and the client, outside of the institution? Professional librarians spend lots of time not actually meeting people's needs. (2) There is no reason why a library needs to be run by librarians; it could be run by a manager, with librarians out in the field functioning as consultants. Librarians see themselves as service-oriented; many users do not. (2) This is reflected in the fact that people don't think of going to see a librarian; they go to a library. And yet, people don't think in terms of going to the doctor's office; they go to see the doctor.

Need to state explicit performance objectives for libraries--some minimum set of criteria within a modern definition. Not standards, but a definition that encompasses a checklist of minimal-level services. What should be expected from a library? Networks need to have this, to determine eligibility of participants, and citizens need to know how to judge the adequacy of their own libraries. Also need to phrase these performance objectives in terms of benefits. Ordinary citizens see only the tip of the iceberg; we have not articulated the social, educational, cultural, and other measures of worth of libraries. Do we need to envision a society without libraries to get the point across? (1)

For networking, need to define various roles of libraries, including the school library media programs. There are regional library concepts--resource sharing among counties--but no real definition or models of what the connections should achieve. (1)

Need to define alternative forms of library service--a continuum from archival functions to source-answering services (e.g., in a corporate technical information center)--and to help libraries identify where they are and where they belong on the spectrum. Each library or information center cannot be all things, and various configurations are needed. (2)

The Discipline and Research

A basic problem is lack of funding for research; therefore, researchers are not being trained in research methodologies in the library and information science field. It is a vicious circle. (1)

Why is there no national-level research support in our field from NIE? Although such support might help our field, the problem remains that our field is not just a subset of education--many of our library and information services take place outside an education context. What about them? Then scientists ask "what is information science," so we don't have a home in NSF. Where is home for our field? (1)

Research to be done in the future will depend on the methodologies that people have available to them. (1)

What is the relationship, if any, of the law of entropy to information processing? Need an interdisciplinary approach to studying this area. (1)

There is little empirical basis for the old laws that are being cited in support of bibliometrics. Needs considerably more work. (1)

What is the relationship between library science and information science? (1)

Most researchers in our field come from the humanities and from the hard science cognitive approach to research. Need to address problems more from a behavioral and social-science perspective. (1)

Our field has been fragmented in the past, a result of its humanistic orientation and viewpoint. The result is that commonalities across information problems and services have not been seen and researched as such. (3)

There really is no library science. We need to adopt the discipline of information science and develop academic programs that produce information professionals trained for a wide variety of positions, only some of which involve traditional librarianship and books. (1)

More futures research is needed--will not be more of the present. (1)

How does research (and how do research methods) relate back to practice? (1)

APPENDIX C

BACKGROUND: PATTERNS IN LIBRARY AND INFORMATION SCIENCE RESEARCH

Although the focus of the present project has been on research needs within today's and tomorrow's environment of library and information services, the project team reviewed past research activities, to provide an appropriate historical perspective for the project work. This section reviews trends in funding, identifies the organizations that have traditionally funded library and information science research, and reports the results of our analysis of various funding sources.

Early Patterns and Trends

A number of major articles have characterized or illustrated significant aspects of the evolution of research and research support in library and information science. The entire October 1957 issue of Library Trends was devoted to "Research in Librarianship." For that issue, a group of 12 authors covered 11 different areas of librarianship, including readers' services, the school library field, mass communication and adult reading, and research methodology and applications. The issue concludes with a proposal for coordinating library research.

It is instructive to consider some of the observations and conclusions in Shera's chapter on "Research and Development in Documentation." From his own investigations, and with help from the National Science Foundation and the American Documentation Institute (the predecessor of the American Society for Information Science), he identified a total of 76 current research projects, in eight areas of documentation: use of information and user requirements; indexing, cataloging, and classification; coding for mechanized searching systems; equipment for information storage, retrieval, and reproduction; theory; mechanical translation; production and dissemination of published information; and education and training for documentalists. These projects reflected an important historical trend in documentation at that time, away from its origins in photographic reproduction, particularly microphotography, and toward "systems for information retrieval." Such systems continue, to this day, to be a major focus of information science research and development.

Shera found that only nine of the 76 projects were being carried out by government organizations, such as the National Bureau of Standards, but many of the projects being done by professionals in profit and non-profit organizations had been undertaken with federal support. He estimates that 75 percent of all the projects involved the use of federal funds and suggests that, in terms of actual dollars spent in research, the percentage was even higher. He also expresses concern over the lack of depth and volume of research in the field, as well as the neglect of fundamental (basic and theoretical) research. These problems were all the more disturbing to Shera because of his belief that "probably no aspect of librarianship is more amenable to research than is the field of documentation."

While the field of "documentation" was developing its pattern of research and applications, and evolving into its successor field--information science--

the field of librarianship was also evolving. Writing on 100 years of research in librarianship, Jackson (1976) reports that "although library publication between 1876 and 1930 includes some materials valuable for writing history, the value tended to lie in the authors' ability to call on their personal experience in libraries rather than in systematic scholarly research." For the most part, research to that time was largely confined to "fact gathering," which was given impetus by the (then) U.S. Bureau of Education's initiating the collection of library statistics, as well as by later isolated survey efforts by individuals and associations.

Jackson credits the formation of the Graduate Library School at the University of Chicago, in 1928, with the introduction of a "research style customary in the academic and professional world." He notes that this important milestone was followed by several others. One of these was the launching of _Library Quarterly_, in 1931, to encourage research and publication. Another was the social science research approach taken in the work of Douglas Waples and Ralph W. Tyler, and reflected in _What People Want to Read About_, published in 1938. The study underlying this publication had a number of sponsors, including the Carnegie Corporation, through the American Library Association and the American Association for Adult Education.

Jackson also mentions the earlier-referenced publication--the October issue of _Library Trends_ in 1957--as the first major review of research, even though not all that was labeled research really merited that label" and "...no great satisfaction could be reported." Among the other studies, he singles out for particular mention Tauber's "Survey of Surveys," which cites lessons learned from some 500 libraries; his own early work, in 1956, that assembled data on "how 5500 library patrons actually used catalogs at 39 libraries of different sorts and sizes;" and Fussler and Simon's study in 1961 (revised in 1969) of _Patterns in the Use of Books in Large Research Libraries_, funded by the Council on Library Resources.

Jackson includes some aspects of the history of documentation in his review. He observes, about documentation, that the "sophistication so often bought by money, sometimes only by money, appeared...not surprisingly, in the offices of the scientists close to industrial and military matters." He traces the institution of various funding sources, including the National Science Foundation and the (then) U.S. Office of Education, as well as the introduction of various publications. He concludes the article with the thought that "... as one looks back on one hundred years, research publication has gained in financing and sophistication, but the defects may well owe something to uncertainty philosophically..."--uncertainty that he attributes to a lack of clarity in "purpose and direction of our libraries and librarianship."

Patterns and Trends in the 1970s

General Trends. Reviews of the status of research in library and information science, particularly by those who have recently studied funding sources and patterns in funding, provide a very mixed picture:

> This brief review of research in library science highlights the progress being made in this important segment of the profession. While federal funding for library research is not increasing, it

> is not decreasing either, and it has tended to maintain a fairly consistent level during the past several years. A number of research projects have been completed in the past three years, and the reports of their results have added substantially to the profession. (Slanker, 1978)
>
> In the past three years library research has continued to advance. (Miele, 1979)
>
> From an overall assessment of the amount and adequacy of funding support for research in libraries...must conclude that such support is meager... (Whitbeck et al., 1979)
>
> As a final comment on what seems to be a rather bleak prospect for the future, despite the considerable advances in public library research in the last decade, it is clear that the impact of this research is blunted by poor bibliographical control mechanisms, poor availability of copies, and failure to synthesize or rewrite research findings in a form available to, and acceptable to, practitioners. (Garrison, 1980)
>
> None of us here would argue that research in our field is adequate to the need. Far from it. But, respectable research can be done without 'major funding.' While we are looking for major funding, we need to remember that and act accordingly. (Lynch, n.d.)

Clearly, differences in overall perceptions of the status of library and information science research stem in part from the particular aspect (e.g., area, funding, quality of research, or dissemination) that is being reviewed. However, we may also be in a kind of "chicken and egg" bind wherein our perceptions of trends, particularly in funding support and in progress in specific problem areas, are highly colored by our varying expectations. In turn, these expectations may be dissimilar because we do not share a common knowledge of the history, objectives, challenges, and accomplishments of library and information science research.

But, even if we shared common perceptions and expectations, we would be faced with two other major problems. One is that we do not know how much money is now being spent for library and information science research. The total funding provided by the "name" research-sponsoring organizations is probably only a fraction of what is being spent in various public and private organizations for research that is directly relevant to their needs. However, there is little or no information on funds involved in such research, much of which is never reported in the professional literature.

Lynch (15), Director of ALA's Office for Research, conducted an informal survey prior to a Preconference on Library Effectiveness. The objective was to find out how the research of the participants was funded, as a stimulus for discussion at the conference. Of the 18 respondents, the majority did not have funding from any federal agency or foundation. They covered research costs in a combination of several ways, e.g., from personal funds and local institutional support. Lynch acknowledges that the people questioned constitute a very small sample of the universe of those who have ideas about investigating library effectiveness. "But these are people who have done good work and many of them are telling us that they did it with a small amount of money found in various places besides those we think of as the 'major funding agencies.'" Her belief is that "most research in our field is done by people who care about doing research and such people find ways to get the work done even if they can't interest someone with a lot of money in supporting it."

Whitbeck et al. (1979) conducted a study of FY 1976 funding of research in librarianship, using (1) a review of various published sources and (2) a survey of individuals in library schools and in public and academic libraries. From published sources, they identified a total of $3.2 million of national-level funding, from federal agencies and foundations. (The mean and median for project support were $57,000 and $52,000, respectively.) They found that the largest source of funding among their survey respondents who were engaged in research was the federal government but that this funding provided support to only 24 out of the 100 researchers. The other researchers either had institutional support, state support, or foundation support, or they had no financial support at all. This survey, which did not attempt to cover corporate libraries and information centers or commercial information organizations, demonstrates the fact that support for research is not limited to the federal and national level and suggests the difficulty of identifying the total expenditures on library and information science research in the United States.

The second major problem is that there is no common agreement on what proportion of total expenditures in any field or in any endeavor should be allocated for research, to continue effecting improvements. Even if comprehensive data on research funding were available and were assembled regularly, in a systematic way, we would still need to develop a reliable estimate of the expenditures in the library and information services "industry," to establish a rational basis for estimating reasonable R&D targets.

In his study of research in the 1970s on public library problems, Garrison (1980) addresses this problem. He identified 90 doctoral dissertations in his study, 40 projects funded under Title II-B of the Higher Education Act (HEA), and 63 other reports, monographs, or studies. About 55 percent were conducted in universities; about 15%, in R&D firms; and about 10%, in municipal/state, and regional agencies. The research areas addressed by these projects were primarily in public services (22%), user studies (19%), and management (17%).

With respect to funding, the largest group of projects, at $7.9 million, were the ones funded by HEA II-B. The total cost of the others could only be estimated, by assigning a cost, e.g., of $25,000 for each dissertation. The total cost of all of this research was estimated to be $13 million. Garrison concludes that this is far too little research to sustain "what is, in effect, a $2-billion-a-year enterprise." Many library and information science professionals might agree with this conclusion but would be hard-pressed to say what the proper level of research funding should be or even whether the $2-billion figure is (was) correct.

Trends in Federal Funding. Building on an earlier review by Cylke and Zenich (1970), Janaske (1975) identifies some of the major federal programs that have provided funding in the library and information science area. He notes that "one of the earliest public records of reference to federal support for research in librarianship appears in the Hearings before the Subcommittee on Education relating to the Higher Education Act" (1965), when a representative of ALA stressed the need for legislation that would encompass "research in the many areas relating to libraries and library activity." The context of this appeal was in the area of training, but the underlying message was related to the broader need for research to understand users and to learn "how to make our libraries even more effective instruments in our community life."

Janaske notes that, although the research initiative carried in Title II-B of the Higher Education Act of 1975 was pre-dated by several government programs (e.g., in the Directorate of Information Sciences of the U.S. Air Force Office of Aerospace Research, established in 1956, and in the National Science Foundation's Office of Science Information Services, established in 1958), the Act was the first legislation "intended to serve any and all concerns for library research." Although no formal public debate has ensued in recent years over the placement of library research in the (then) U.S. Office of Education (USOE), it is interesting to note that some professionals are not comfortable with this placement. Garrison (1980) expresses this concern for research support in the public library arena: "The dominance of the U.S. Office of Education as a source of funding for public library research is troublesome in that the agency does not see research support as a major goal...." and "Moreover, the fact that most of this ($13 million) federal money came from one agency, the U.S. Office of Education, is alarming, since the responsibility for public library matters has never really seemed to rest easy in that agency, and library programs there are constantly threatened."

Another important USOE program reported on by Janaske was the Small Grants Research Program, which, until its demise in 1973, fostered small (under $10,000) research project grants to colleges, universities, state departments of education, and other public and private groups.

Janaske reports that, from Fiscal Year 1967 through Fiscal Year 1974, USOE awarded 221 projects, for a total commitment of approximately $18.7 million. Over 50 percent of the projects were conducted in the academic community and 25 percent, in non-profit organizations. He groups the subject matter of these projects into five categories: institutional cooperation to serve special target groups; technology; functional development (e.g., reader services and processing); planning and development; and education and training.

As noted earlier, Jackson (1976) makes the point that money can buy sophistication. Janaske expresses the view that money essentially saves time. "Many of the projects funded as research and demonstration could have been done without federal support, but it might have taken ten to twenty years longer to get the job done." He concludes with a partial answer to his own question on the impact of research: "If the project served no other purpose, at least the efforts did provide a benchmark or point of departure against which future judgments might be made. This may be the essential ingredient of all research--the establishment of a point of departure for future action."

This view on the impact of research is certainly useful. It suggests that, if future action involves further research, there must be means for and commitment to cumulative research--i.e., building on earlier works. And, if future action involves implementation, there must also be effective access to research results and practitioners must be able to understand, interpret and, as appropriate, apply those results.

Project Analysis of Funding Sources and Research Areas

Although there are several major sources published on the funding of research in library and information science, most sources do not provide sufficient detail for a comparative analysis of the research topics involved. Therefore, the project team gathered data and conducted its own analysis to provide some baseline data for this historical perspective, as reported earlier, in Chapter III. This section presents additional detail on our analysis of selected funding sources--their funding amounts and areas of support--covering the period from 1970 through 1980.

Major Funding Sources. In Exhibit C-1, we identify each of nine national-level major funding sources and the approximate funding for library and information research projects for the years in which data were made available to us. Funding sources are listed in rank order according to the levels of funding, from the highest to the lowest. Of the nine major funding sources included in this analysis, four have provided more than $5 million, over the 10-year period. They are:

- The National Science Foundation/Division of Information Science and Technology (formerly the Office of Science Information Service), which, during the period 1974 to 1980, provided approximately $33 million for information projects.
- The Department of Education, Office of Libraries and Learning Technologies (formerly the Office of Libraries and Learning Resources), which, during the period 1970 to 1980, provided approximately $10.5 million for library research and demonstration projects.
- The National Library of Medicine, which, primarily through its extramural program, provided approximately $8 million to information science and systems research in the health sciences during the period 1970 to 1980.
- The Council on Library Resources, which, during the period 1970 to 1980, provided approximately $5.3 million to research, demonstration, and development projects in the library area.

Other major organizations that fund library and information research do so to a lesser extent, and generally within a specific area. For example, the National Library Service for the Blind and Physically Handicapped, the Library of Congress, supports research projects related to its target population, and the Department of Education, National Institute for Education sponsors studies specifically directed to services for the educational community. With the exception of the Council on Library

Exhibit C-1. Summary of Library and Information Research Funding Patterns*

FUNDING AGENCY	YEARS								
	1970-71	1972-73	1974-75	1976	1977	1978	1979	1980	Total
National Science Foundation, Division of Information Science and Technology	N.A.	N.A.	$10,207K	$4237K	$3657K	$4576K	$4816K	$5570K	$33,063K
Department of Education/Office of Libraries and Learning Technologies/ Library Research and Demonstration Branch	2347K	3028K	1410K	1036K	1116K	776K	730K	142K	10,585K
National Library of Medicine, Extramural Grants Program	1659K	842K	2091K	604K	803K	932K	268K	N.A.	7199K
Council on Library Resources, Inc.	2020K	1124K	1672K	191K	227K	43K	40K	-0-	5317K
Carnegie Corporation of New York	-0-	1423K	404K	11K	515K	406K	635K	194K	3588K
National Endowment for the Humanities	50K	-0-	1803K	452K	35K	57K	262K	16K	2675K
National Library Service for the Blind and Physically Handicapped, Library of Congress	N.A.	N.A.	N.A.	180K	301K	-0-	955K	284K	1720K
Department of Education, National Institute for Education	-0-	-0-	450K	-0-	130K	75K	442K	-0-	1097K
National Commission on Libraries and Information Science	N.A.	204K	292K	49K	-0-	88K	-0-	136K	769K
TOTALS	$6076K	$6621K	$18,329K	$6760K	$6784K	$6953K	$8148K	$6342K	$66,013K

NOTE: N.A. means the data were not available.

*Total dollars for multi-year contracts have been allocated to the year in which the contract was awarded.

Resources, the private foundations tend not to fund research but, rather, to support network development, collection development, or public and academic libraries.

Three organizations not included in this analysis--the Charles A. Dana Foundation, the Andrew W. Mellon Foundation, and the Department of Education, Fund for the Improvement of Post-Secondary Education--also provide funding in this area. The two private foundations in this group tend to direct their funds to such areas as the development of library networks, library construction or modernization, and general support. The Fund for the Improvement of Post-Secondary Education has supported a few library- and information-related projects. Its funding is generally for the development of information and referral services or for the development of computer-assisted-instruction programs.

A number of other organizations and agencies that are associated directly or indirectly with interest areas in our field would need to be included in a full-scale analysis of this type. The Special Libraries Association (SLA) sponsors a Grants-in-Aid program that supports research projects carried out by units of the Association or individuals and groups. From 1974 to 1980, SLA funded six projects for a total of approximately $4000. The Exxon Educational Foundation has supported the Council on Library Resources (CLR) and academic libraries. During the period 1978 to 1980, the Foundation contributed approximately $400,000 to the support of CLR and these libraries. Other units of the National Library of Medicine (NLM) also contract for studies, e.g., the Planning Office is currently administering a contract to study the role of the academic health science libraries in education for health professionals in the '80s. The National Historical Publications Commission has, since 1975, supported research on the preservation of materials. The commission estimates that $300,000 to $400,000 has been provided for such research. Other possible sources of support that would need to be considered in a full-scale analysis include institutions and agencies at the regional, state, and local levels, as well as other associations and professional societies, and commercial information service organizations.

APPENDIX D

FULL DESCRIPTIONS OF THE RESEARCH AGENDA PROJECTS

In this Appendix, we present the full copies of the originally prepared draft descriptions of the Research Agenda projects. The descriptions are presented in numeric order, to facilitate locating individual projects referenced and discussed earlier in Chapters IV and V of the text.

In cases where a Research Agenda project encompasses several different projects, we first present an introductory section, based on materials prepared by the participants who developed the combined project. This section is followed by summaries that we have prepared of the individual project descriptions embodied in the combination research project.

PROJECT 03: EXPLOITING THE TRUE CAPABILITIES OF ELECTRONIC PUBLICATION

Background: The application of computers to any activity usually proceeds through two major stages:

(1) Performing electronically some task that was previously performed manually. The capability may be enhanced, the efficiency improved, or the costs reduced, but the activity remains essentially the same.

(2) Applying electronics to do things not possible in the manual mode of operation.

In the application of electronics to publishing, we still seem to be in the first of these stages. An electronic publication today is little more than printed pages displayable on a screen. Putting the Encyclopaedia Britannica online does not make an electronic encyclopedia, nor does putting the Journal of Applied Physics online make an electronic journal. Such events should be considered merely interim steps on the road to true electronic publication, i.e., publication that exploits the true capabilities of the electronic medium.

Purpose and Objectives: At the present stage of development, it is very difficult to demonstrate the real potential value of electronic publication and to show that a properly conceived electronic publication could be an order of magnitude more effective than one printed on paper. Only in the case of indexing and abstracting services have the obvious advantages (e.g., flexibility and depth of search) of online access over print-on-paper access been clearly shown.

The purpose of the proposed study is to demonstrate what a publication designed ab initio for electronic access would look like. At the same time, the study would experiment with alternative methods of information presentation and would measure user response to these alternatives.

Methodology: Demonstration, experimentation, and user reaction studies are proposed. While the experiments could involve any type of publication (even an electronic novel), it is proposed to restrict the study to three types: encyclopedias, textbooks, and research journals.

Capabilities offered by the electronic medium that are not available in print media include:

(1) flexible, re-organizable text (i.e., a form of "hypertext"),

(2) dynamic analog models of operations and activities,

(3) sound output (of value, for example, in an encyclopedia article on bird song or the works of a composer),

(4) inclusion of access to programs, where such programs have been used in a reseach project, and raw data, allowing the user of the publication to derive new results by plugging in alternative variables.

Since the project is a research--rather than an implementation--project, the purpose is to experiment with methods of presenting information. One could visualize, for example, an electronic encyclopedia in which an electronic analog model, under user control, demonstrates the forces acting on an aircraft to show what causes it to fly. How much more effective than static illustrations! Likewise, one could visualize a research journal in, say, applied mechanics, in which the effect of various types of loads on a particular structure (variable in intensity under the control of the reader) can be demonstrated through an analog model. One can also visualize a textbook in which the sequence can be re-organized to suit each reader, the contents can be indexed by each reader, reader and instructor notes (including to each other) can be incorporated, and so on.

Many of these capabilities already exist within systems of computer-aided instruction (e.g., PLATO), so this type of system would provide a hospitable environment for such a project. The whole project may best be performed within an academic community in which three different faculty teams would work independently on three (publication-related) subprojects. Clearly, there would be an overall project coordinator and a high level of interchange among the subprojects. The project teams would need to identify subject specialists willing to experiment with new methods of presenting information in electronic form (i.e., to make contributions to a prototype electronic encyclopedia or a prototype journal, or to construct some section of an electronic textbook). For each prototype publication, it would be necessary to establish a suitable audience willing to use the publication, evaluate alternative methods for presenting information, and provide reaction. If the prototype encyclopedia were aimed at children, pupils in selected schools could participate in this phase of the project. The fact that some schools are already using CAI systems reinforces the suitability of the CAI environment for this type of study.

On the scale proposed, this would be an ambitious study and one not easily implemented. Nevertheless, this type of work needs to be done if we are to achieve the true capabilities of electronic publication.

Cost: Difficult to cost because of so many imponderables (e.g., would all contributors require payment? how many articles would be needed to form a useful nucleus? how much of a text?). Could easily cost $500,000 for each of three years.

PROJECT 04: AN ONLINE NETWORK TO SUPPORT QUESTION ANSWERING IN LIBRARIES

Background: It is undeniable that OCLC has been highly successful in using online technology to facilitate a cooperative approach to cataloging among libraries. It seems somewhat ironic, however, that the most extensive library-initiated application of this technology should have been aimed primarily at improving technical processing rather than public services. The main initiative in the application of online systems to public services--namely literature searching--has come more from the private sector than from the library community itself. It is only recently that online systems have been moved, by this library community, closer to public service applications--to online catalogs, including union catalogs, and to interlibrary lending.

While online systems have had a profound effect on the literature-searching activities of libraries, they have so far had a negligible impact on the other major component of reference service, namely the answering of factual-type questions. One reason is simply that appropriate databases and data banks have not been available. This situation is beginning to change as various kinds of "reference books" become accessible online. Nevertheless, there seems to be little doubt that an online cooperative network that could substantially raise the level of question-answering services in libraries could now be implemented.

Purpose and Objectives: The major justification for this project can be summarized as follows:

(1) Several studies conducted obtrusively or unobtrusively in (mostly public) libraries have repeatedly confirmed that the probability of getting a question answered completely and correctly is shockingly low: little better than 50 percent for all questions and all types of libraries on the average.

(2) The probability of getting a correct answer is lowest for questions in which the answer has recently changed.

(3) Small public libraries tend to have a limited capability for question-answering because of limited bibliographic resources.

(4) It is likely that the same questions are repeated time and time again in libraries of various types up and down the country. On a national scale, this approach can hardly be considered cost-effective, since some of these questions may require a considerable amount of time to answer.

(5) A question that is difficult for one library to answer may be simple for another. Thus, a special library might produce in one minute an answer that might take a public library an hour or more of staff time to locate.

(6) Some libraries maintain card files of answers to "difficult" or frequently asked questions. These are limited in value because of limited access approaches and inaccessibility to other libraries.

(7) There is very little cooperation among libraries in question-answering at the present time. Nevertheless, the potential is great.

(8) Some large public libraries update reference sources (e.g., names of national and local goverment officials) on a daily basis, and such work is duplicated throughout the country.

The purpose of the proposed study is simply to demonstrate that an online cooperative network to support question-answering is viable, including economically viable, and that it has the potential to improve substantially the quality of reference services in libraries of all types. The beneficiaries will be the libraries themselves and their users.

Methodology: A demonstration and market research project is proposed. The demonstration would be modeled on the OCLC approach to cooperative cataloging. The first step would be to build a nucleus database to get the project moving. A suitable approach would be to build this nucleus from existing card files maintained by one or more large public libraries (e.g. Chicago) or regional reference libraries. The file would need to be edited and (possibly) answers/sources verified prior to putting it in machine-readable form. A single record might consist of:

- text of the question posed,
- the answer supplied,
- source of the answer (bibliographic or other),
- date of the record, and
- symbol for the contributing library

The initial file should probably contain no fewer than 100,000 records to have provable value for demonstration puposes. The file would not be indexed but would be searchable on keywords in questions and in answers. A KWIC-type display would probably be useful (e.g., one could view all questions in which "Roy Rogers" appears).

Once the initial file is created, it would be made widely accessible to potential user libraries. This might be done through an existing network, such as OCLC, or through one or more of the commercial services (BRS, Lockheed, or SDC).

For the feasibility study, a relatively small number of libraries would be invited to participate. Large public libraries would be obvious candidates. In the long run, however, the strength of the enterprise would depend on wholesale involvement of libraries of all types.

Participation in the project would involve:

- use of the file as a prime source for question-answering
- adding new records to the file as new questions arise in cooperating libraries (some type of formatted display for input would be needed; so would guidelines on types of questions to be included),
- evaluating the use of the file and maintaining time/cost figures.

The pilot project is intended to demonstrate utility but also to allow some experimentation (e.g., with different policies regarding content). Since the file would grow rapidly through library participation, the full capability would only be reached when the project moves out of the demonstration phase and into full implementation. When this occurs, new features would be introduced, including:

- a file of unanswered questions (participating libraries would be urged to check this file regularly; a question unanswerable in one library might be simple for another), and
- division of regular update responsibilities (e.g., library A would be responsible for updating entries relating to sports).

In the long term, such a file would be self-supporting, since libraries would be subscribers. Presumably, the libraries adding records would receive some financial credit. This file could eventually become the single most important source for question-answering in libraries of all types. It could reduce the size of reference collections in print-on-paper form and greatly improve the overall quality of reference service, especially in small libraries.

Cost: Would depend on the size of the initial file, the number of participating libraries and many other variables (e.g., for demonstration purposes, would the full costs be borne by the project or would the partipants absorb the access costs?). A two-year demonstration/experimentation/market research project, including cost of file file editing and conversion, might be supported for about $500,000.

PROJECT 09: TECHNIQUES FOR MARKETING LIBRARY AND INFORMATION SERVICES

Background: Given the difficult nature of the times and the trends toward reduced government spending, which daily gather momentum, it is clearly essential for American libraries that a form of organization be developed that maximizes the usefulness of library services provided, thereby making the institution more vital and likely to survive.

Libraries must be agile and flexible enough to move beyond their old roles and responsibilities. They must tailor their services and offerings more exactly to the needs of the community. Thus, we have advocated more than a cosmetic change in the substance of American libraries' service programs.

Studies have repeatedly shown that the general public's perception of the role of the library as an information source provider has been grim. Even if the substance of library service programs has been modernized to be oriented more toward user needs, libraries will not be utilized fully without an aggressive marketing plan to inform the information-seeking public of their services. Thus, if libraries are to achieve viability in this new socio-economic climate, they must adopt more agressive, bold, and response-oriented strategies: they must pursue a more competitive stance toward each other. In short, library management should take a lesson from private business: the information-seeking public should be viewed as potential consumers who are to be drawn to the library actively only through more attractive services and more extensive marketing strategies.

Current efforts in the area of library marketing are insufficient and ineffective. The traditional forms--bulletin boards, posters, displays within the library itself, telephone listings, yellow pages, ads in journals, newspaper ads, word-of-mouth advertising, publications, lectures, etc.--certainly will not hurt the library but ultimately will not solve library problems. In recent years, more potent and more flexible advertising via mass media advertisements have brought better results, but they also are not sufficient.

What is necessary, then, is that, in addition to the commonly known marketing forms described above, libraries must be aware of, and must possess the competency to use, relevant business-oriented competitive marketing techniques, with or without modifications. In this way, when libraries see themselves as competing with other information providers (including information brokers, private and public consultant/advocacy groups, and the like) for the prize of the patronage of the public information consumer, libraries can make their fiscal position secure and invulnerable.

The proposed project will attempt to bring together a body of literature to support and defend the need to utilize modern marketing techniques in promoting library information services. Though it is recognized that some library information professionals harbor almost instinctive reactions against the introduction of active and aggressive marketing techniques to library management, and that this negative inclination cripples their ability to formulate a workable and productive set of guidelines and objectives in expanding library services, it is likewise recognized that the first step in modernization must take place in the area of attitudes, inclinations, and perceptions.

Marketing is not seen to be a cure-all. It can only achieve maximum effectiveness in conjunction with an actual program of innovation and development in available library services, just as any advertising is most persuasive when the product itself is worth buying. As stated by Peter Drucker, marketing and innovation are the only two basic functions of a business. (1)

The responsiveness of the library to the community can be increased by the use of polls, questionnaires and the encouragement of feedback, inquiries and complaints. In short, the information-seeking public should be viewed as consumers upon whose patronage the fiscal stability of the library depends, just as does that of any business.

Purpose and Objectives: This project has multiple purposes. Its ultimate aspiration is to make safe the expansion and development of libraries in the face of a fiscally uncertain, foreboding future. It would attempt this through the advocacy of a more prominent role for libraries in serving the basic needs of the community, since, if the libraries must in some places compete with essential services such as fire and police departments, the willingness of the taxpayers to support these institutions is directly proportional to their perceived benefit from that institution. If libraries must compete with police and fire departments, it is necessary that the library occupy at least a comparable position of indispensable service to the public.

It is anticipated that, given an awareness of the needs of the community, library managers can adopt programs and services more useful, valuable, and worthwhile to the taxpaying public. Once these new offerings have been developed and innovated, the information seeking public can be made cognizant of their availability through effectively designed, intelligently deployed marketing techniques.

Thus, the immediate objectives of such a project include:

- identification of viable marketing research techniques,
- determination of those that can be used "as-is" by non-profit organizations such as libraries, those that should be employed with modifications, and those that are of no real relevance to libraries,
- formulation of library marketing strategies in coping with competition,
- heightening of the librarians' awareness of the importance of modern marketing techniques.

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(1) Peter Drucker. Management. New York: Harper & Row, 1974. p. 61

Methodology. Marketing research and its related techniques are essential subjects that have been extensively covered in fields such as management, business administration, economics and the like. Ideally, this project should be carried out by experts drawn from these interdisciplinary fields, as well as from libraries.

The proposed project conceivably can be designed in two phases: Phase I will synthesize information available through both formal and informal sources, including experts in fields such as business administration and management. The steps to be covered will be similar to those presented in project #07, "Information Seeking Patterns of the 'Information Poor'." While the project's emphasis will undoubtedly be related to non-library fields, it will also include a thorough literature search on library marketing practices.

In this phase, it is expected that emphasis will be placed on the types of marketing strategies that deal with competition, since libraries are facing abundant competition. For example, marketing strategies dealing with competitive forces in the open economy, such as "the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services, and the jockeying among current contestants", as discussed by Michael E. Porter (2), will be of great interest to the project.

Phase II will be an exploratory research project involving case studies of those libraries that have employed some of the aggressive marketing strategies in selling and promoting their services and examination of the impact of these techniques. Because of present OMB regulations, nine libraries will be selected, the basis for selection to be determined later by the researchers. On-site interview techniques will probably be the most appropriate. They will be implemented through the use of a questionnaire, which will be designed jointly by a project staff that includes marketing experts.

Cost: Because of the interdisciplinary, cooperative nature of the project, it is expected that no meaningful results could be accomplished without funding of at least two professional person-years.

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(2) Michael E. Porter. "How competitive forces shape strategy." Harvard Business Review. March-April 1979. pp. 137-145.

PROJECT 11: ALTERNATIVE FUNDING POSSIBILITIES FOR PUBLICLY SUPPORTED LIBRARY AND INFORMATION SERVICES

Background: The fiscal situation confronting American libraries is grim. Made vulnerable by a long-term dependence on local sources of taxation (most notably the property tax that is the target of Propositions 13 and 2 1/2 and many other similar proposals), libraries are reeling from each successive budget cut.

It would seem that the only solution that truly cuts to the heart of the problem is the development of sources of revenue outside the taxpaying cycle. One alternative that has been largely ignored, however, could at least offer some security, while allowing libraries to expand their services more than ever before. This option is that of charging some kind of fee to certain segments of the library's clientele for the use of some services.

The belief among most library managers in America that their public institutions are by design and philosophical necessity free and open to all is still persuasive and influential. It is their strongly held conviction that non-fee charging libraries are an element of democracy, that such institutions allow individuals to make informed choices, educate themselves up from poverty and achieve true equality. To charge for certain library services, they say, would be like charging for sunlight or freedom of speech.

Though there is still a profoundly rooted inclination to reject the notion of a fee library, the serious realities of recent times have compelled many managers to avail themselves of this alternative. In an American Library Association Survey (1) it was noted that one library in five charges rental fees for certain books, one in three charges for film borrowing, one in 27 charges registration fees, and one in 60 charges for admission to library-sponsored programs. Recently, the Dallas Public Library System launched an extensive nonresident-fee-card program that charged individuals who did not support the library through tax dollars to pay for the use of its resources. (2)

If libraries are to survive and prosper in the troubled fiscal times ahead, then they must shed their dinosauric modes of thinking about the roles, responsibilities, and duties of a library to the community it serves. Managers should actively and aggressively locate and utilize non-traditional sources of funding. The monies lost as a result of property-tax reduction schemes can be partially replaced through apppeals to other government sources (i.e., state and federal); however, this is only a piecemeal, temporary patch-up solution to the problem. As long as libraries are seen by the public as one of the most expendable government services (as we conclusively have shown in a recent poll (3)), and cuts must be made, libraries, wholly dependent on government funds, will stand on very uncertain ground.

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(1) American Library Association, "Debating the financial future." Editorial Research Repports 2:811-819 (November 9, 1979).

(2) Donald A. Hicks, "Diversifying fiscal support by pricing public library services: a policy impact analysis." Library Quarterly 50: 453-474.

If fee libraries are, at least partially, a viable alternative for fiscally pressured institutions, it is clearly essential that studies be conducted at the soonest possible moment in order to survey the different modes of this approach and other alternative funding approaches to assess their relevance to different situations. There is still a dense tangle of central questions left virtually unanswered:

- What sources are available?
- Which of these are practical or realistic possibilities and why?
- Which services could or should be charged for?
- Who are the target (i.e., fee-paying) groups?
- What are their abilities to pay?
- What will be the total effect of fee libraries on the relationship of the library with the community?

This study, if funded, will attempt to lay the groundwork for answering some of there questions, so that, even if library managers decide to reject alternative funding as a means to fiscal security, they will make this choice out of knowledge and not ignorance.

In addition to fee-for-service as an alternative funding source, other possible sources also exist, including networking libraries with private-sector organizations to provide relevant information services and teaming up libraries with volunteer organizations to share the expenses of comprehensive information programs.

Purpose and Objectives: One of the first objectives of this proposed project is to generate a piece of empirical research that will open the eyes of library managers to the great potential of this form of alternative funding. The survey would attempt to show that a fiscally-vital library offering more extensive and responsive services would be of more value to the whole community than a financially-crippled one. It would try to show that library services can differ from essential services such as police and fire departments in that the upholding of the law or the curbing of fire is a communal benefit, while the library's provision of information can be, in part, a private one that should (in certain cases) be accompanied by a fee. While fee-for-service will most likely be the emphasis of this project, other additional funding sources and/or possibilities will be explored as well.

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(3) Lawrence J. White, "The public library--free of fee?" New Leader (December 17, 1979). pp. 3:5

The proposed project would explore the viability of a battery of alternative funding options currently open to library managers in the United States. If such alternative funding strategies were adopted, it would reinvigorate the growth of libraries and halt the decline that is inevitable with diminishing financial resources. It would reduce single-source dependency and diminish fiscal vulnerability.

If a cogent and well-designed reorganization were initiated, including fee library programs such as that at the Dallas Public Library, this would lead to a vastly increased level of library responsiveness to community needs, to a greater interchange of empathy, perceptions, and feedback between the library and information consumers, and to enhanced involvement of the library in community affairs, which would, in turn, make taxpayers more willing to help support the library.

It is hoped that the institution of alternative funding would allow an overall regeneration of American libraries. In giving managers and key decision-makers a realistic, non-biased picture of the problems and potentials of alternative sources of funding, it is intended that further research on the topic will be stimulated and the choices--when they are made--will be the wisest and best-informed ones possible. Since many (perhaps a majority) of these influential information professionals are still tied to an old, unthought-out attachment to the conception of public libraries as completely free libraries, it is hoped that this survey will make them aware of their options. Ignorance, after all, is a luxury we can no longer afford.

Finally, and most specifically, the survey will seek to answer the body of questions surrounding the issue of alternative funding:

- What exists?
- What is best for my situation?
- What is the feasibility of several of the options?
- If libraries are to charge, who should be charged and for what?

Unitl we begin to address these considerations, we will remain incapable of judicious choice.

Methodology: Given the broad scope and applicability of the topic of alternative funding, and the relative lack of previous research in the area, there are a number of approaches available, each of which would provide unique but valuable results. The proposed project could, therefore, take several forms profitably. It could either be a survey or a more evaluative investigation (i.e., one that would attempt to examine, analyze, and assess the effect of fee-charging on all aspects of library functioning, including relations with the community and government, possible effects upon managerial structures, and the potential impact upon services and organization). The severity of the crisis facing libraries dependent upon single-source funding is such that any type of investigation into this field would yield valuable and vital data and food for thought and action. Because of this, an evaluative survey project is proposed. Survey methodologies using mail questionnaires would probably be most appropriate for this investigation.

Sample size. A small number, say 50 to 100, of publicly funded libraries should be selected randomly from each sub-group of libraries such as:

- small public libraries
- medium-sized public libraries
- large public libraries
- school libraries
- publicly funded community college libraries
- publicly funded academic libraries

Available directories of these libraries can be used as a basis for selection.

Questionnaire design. Questionnaires should be designed in such a way as to encompass all the essential areas covered in many of the questions regarding alternative funding sources mentioned above. One should be designed for libraries and librarians, and another for library users.

Case study on the effect of fee-for-service. The initial survey of the libraries regarding alternative funding will enable the researchers to select nine (for the convenience of fulfilling OMB requirements) libraries with different characteristics in terms of type and size of library, user groups, librarian's views on alternative funding, and users' perceptions and feelings on library services and paying for needed information.

Data analysis. Data processing will be required and it is expected that commonly used analysis methods, such as the Statistical Package for the Social Sciences (SPSS), will be used to analyze the collected data.

Cost. This is a rather involved research project. In order to be able to conduct a meaningful project with a reasonable sample size, it is anticipated that the cost will be at least three professional person-years.

PROJECT 18: DEVELOPMENT OF A CONCEPTUAL FRAMEWORK FOR OBSERVATION OF USER BEHAVIOR WITH ONLINE INFORMATION/DATA SYSTEMS (a revision)

Background. With human/computer interaction becoming so pervasive in our modern society, research on user interaction will benefit literally millions of people. Within the past few years, techniques to improve user-information system interaction that have been suggested draw upon data collected on the actual behavior of users confronted with real retrieval systems. (e.g. Penniman, 1975; Meadow, et. al., 1977). However, in spite of the availability of such data (whether collected by online monitoring, protocol analysis, or direct unobtrusive observation), the absence of any consistent measurement approach makes correlations across systems and studies impractical.

A project at the National Bureau of Standards (Abrams, et. al., 1976) has suggested a framework for one class of variables involved, i.e., those that can be measured through their network monitor machine. In that project, Abrams, et al. identified over fifty variables involving time, length, and rates of interaction. Their measures, while not focused on information search and retrieval systems, suggest a framework for general data that can be used in studying the user interface across many types of interactive systems and that is based on a stimulus-acknowledgement-response model of human-computer interaction. Their results are not in the form of standards, but are a useful means of measuring interaction variables.

The proposed project should result in an expanded conceptual framework or model that is (1) based upon a behavioral science view of the communication process and (2) focused on providing a consistent interpretation for user-system interaction variables. These variables should represent a wide range of user interactions (in terms of system and user functions) and should be illustrated through sample data and analysis procedures. The framework should not be limited to analysis of bibliographic retrieval but should be applicable to a variety of text-editing and information/data display functions. Numerical analysis and graphic-display-oriented interactions should not be included at this stage, although the framework should allow for such variables to be included in the future.

Consistent and meaningful techniques for defining and measuring user behavior must be available for those organizations developing services for an expanding base of naive users. For example, in the coming years, many libraries will expand their services to include public access to online catalogs, replacing the older manual systems. This will require more attention to the design of user interfaces for occasional and untrained users. Other information service-based organizations also will face similar problems in their growth. Consistent measurement and analysis techniques that are derived from a common theoretical base could contribute significantly to the solution of the interface problem. In addition, existing quantitative measures of user behavior need to be reviewed and placed within a unifying framework.

Purpose and Objectives. The objectives of this study are:

- to develop a behavioral-oriented model or conceptual framework that can be used for developing observational measures of user behavior vis-a-vis online information/data systems

- relate the components of the framework or model to specific areas of system design/operation in order to demonstrate the role of observational data in improving system performance

The justification for this study is the growing interest in data collection regarding user behavior (through online monitoring, protocol analysis, and other observational methodologies) and the lack of a consistent behavioral framework or model for user-computer interaction. The proposed framework should provide a valuable design tool for information systems designers and should provide a common framework within which researchers can present and compare data. Futhermore, sample data for most variables should be included in order to indicate the form and nature of each measure. The proposed study would provide the information research community with an effective framework in which future projects involving user behavior with online systems can be evaluated.

Methodology. The project will be conducted in three major phases with the results disseminated to the research community through the open literature. The phases include:

- Data Collection/Evaluation

- Conceptual Framework Development

- Incorporation of Sample Data into Framework

Phase 1. Data Collection and Evaluation (3 mos.): This phase will produce a comprehensive review of existing research and data concerning online user behavior. Techniques of data collection for this phase will include open literature search (incorporating online database subject searches, citation trails, and library searches) and contact with researchers working in this area (identified via SSIE, NTIS, and other resources). The results from this phase will be organized to provide a comprehensive bibliography with annotations.

Phase 2. Conceptual Framework Development (5 mos.): Based on an analysis of data collected from Phase 1 and an evaluation of the user-computer interface viewed as a communication interface, a conceptual framework will be developed for analysis and presentation of user behavior data. This conceptual structure will include identification and interpretation of significant variables and guidelines for their consistent capture and analysis. Similar dimensions of user behavior can be measured in several different ways and, conversely, the same measurement may apply to vastly different dimensions of user behavior. By placing the behavioral dimension and the measurement techniques identified in the data collection task within a unified framework, it should be possible both to relate different observational methodologies and to choose a comprehensive and nonredundant set of metrics for incorporation in a system being designed. The relationship between (1) data collection guidelines and (2) the mapping of measured variables onto factors affecting system performance will be illustrated through specific examples and in general terms, to aid system designers in organizing the collection and interpretation of behavioral data as an integral part of the design process. The purpose of this phase is to make explicit the relationships between specific types of user-related data and specific parameters influencing the system design.

The conceptual framework or model to be developed will be communication-process-oriented and will encompass variables reflecting user and system conditions and interactions. The development of this framework will be done through synthesis of a process-oriented structure that reflects variables identified from data in Phase 1. The procedure for developing this framework is not rigid, but should involve at least the following steps:

(1) Identify variables reflecting communication process

(2) Determine relationship between these variables

(3) Determine influence of variables upon each other

(4) Synthesize framework from these factors

(5) Evaluate framework based upon available data

(6) Revise framework

Phase 3. Incorporation of Sample Data Within Framework. (3 mos): Examples of observational data will be incorporated into the framework, drawing from published works as well as available raw data (e.g., OCLC, NLM, etc.). As an example, OCLC has collected monitor data on user behavior when cataloging library resources online. This data represents over 100 million individual user interactions (e.g. message/response) per year involving search, text-entry and editing functions and includes general measures of elapsed time. Several other organizations have collected other types of data that could be analyzed within the framework to expand the body of empirical data for system designers. By incorporating samples of existing data into the developed framework, the usefulness of the framework in comparing results across studies will be demonstrated. It is hoped that, by example, this will also encourage other researchers to use the framework for data presentation/comparison.

Cost. The estimated requirements to conduct the study are:

information scientists	1.5 FTE (12 Mos., Phases 1,2,3)
reference librarian	1 FTE (3 mos., Phase 1)
secretary	.25 FTE (12 mos., Phases 1,2,3)
graduate research assistant	1.5 FTE (12 mos., Phases 1,2,3)

Additional expenses:

literature searches, inter-library loans, facsimile/ copyright charges	$2,500
postage, communication, printing	$1,500

References

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Penniman, W.D. "Rhythms of dialogue in human-computer conversation." The Ohio State University. Columbus, Ohio. Unpublished PhD Disseration. 1975.

PROJECT 19: THE INFLUENCE OF SELECTED INFORMATION SEARCH MECHANISMS ON USER BEHAVIOR (a revision)

Background: While a number of different search mechanisms are being designed for information search and retrieval (e.g., menu-oriented, command-oriented, index look-up versus keyword, query by example, natural language), very little is known about how the different mechanisms influence the underlying patterns of human information-seeking behavior. It is generally assumed that users can adjust their behavior to suit the particular requirements of a search system.

With the advent of online monitoring of user interaction, data are available that allow information system researchers to evaluate user behavior. Couple this capability with intelligent front-end devices (terminals or pre-processors) that allow the search mechanisms to be varied for a single system and these tools make it possible to determine how system design and search mechanism design influence user behavior. Also, they allow us to study to what extent users "adjust to the system." There is some evidence that users do not take advantage of the full range of search system capabilities in any given system.

As systems proliferate, it is possible that users retain a "core-concept" of information-seeking methods and use each system on the basis of this approach. If this is the case, then system designers need to understand what this "core-concept" is. Furthermore, the existence of common search behavior patterns across significantly different system designs could be of major importance to system designers. For example, search-session length may be a system invariant and depend mostly on user thresholds (such as patience). Amount of time searching for documents versus reviewing documents or document surrogates may be another invariant.

For the sake of the user, system designers need to have a better understanding of the influence of search mechanisms on user behavior. This study proposes to investigate that influence. Within the context of bibliographic retrieval systems it should be noted that analagous projects could be constructed for both non-bibliographic (textual) and non-textual (data) systems. Such projects should be considered as follow-on efforts to the proposed study.

Purpose and Objectives. Two questions are posed in this study:

(1) How does the fundamental design of the search mechanism influence user behavior vis-a-vis online interaction?

(2) What invariants and/or commonalities in user/system interaction patterns exist across distinctly different search mechanisms?

The objective of this study is to answer these two questions in terms that can be of use to system designers, search trainers, and end users.

Methodology. It is proposed that this study limit its scope to four basic search mechanisms: menu-oriented retrieval, command-oriented keyword with controlled vocabulary, command-oriented full-text keyword, and natural language. The data should be analyzed on the basis of user interaction variables that could be applied across additional systems in the future.

Some fundamental variables include: session length, interactions per session, interactions per minute, and proportion of each session spent doing various classes of activities.

Because of the difficulty of gaining access to monitor data for a variety of systems (particularly from commercial search services), it is proposed that this study be conducted as a controlled experiment using prescribed searches conducted by a selected set of searchers against a system capable of simulating a variety of interfaces. The same searchers should perform searches across the four types of systems. Such system simulators have been developed at library and information science schools. Thus the study could be conducted readily by an academic institition but should not be limited to academic searchers.

The study will involve four phases:

Phase 1 (4 mos.): The four proposed interfaces (based on existing interfaces from other systems with no new interface design) will be selected and simulated.

Phase 2 (2 mos.): Searchers will be selected for the experiment and trained to search across all four systems. At the same time a set of queries will be designed to be used in the experiment.

Phase 3 (2 mos.): A set of searches will be conducted across all four system types by each of the trained searchers. The searches will be ordered for each searcher to test for order effects.

Phase 4 (4 mos.): Analysis and presentation of the data will occur during this phase.

Cost. The estimated requirements to conduct this study are:

information scientist	1 FTE (12 mos., Phases 1,2,3,4)
computer programmer	1 FTE (4 mos., Phase 1)
statistical analyst	.5 FTE (6 mos., Phases 2,4)
graduate research assistant	2 FTE (12 mos., Phases 1,2,3,4)

Additional expenses:

computer time	$5,000
searcher compensation	1,500
printing, duplicating	800

PROJECT 21: EVALUATION OF THE CHANGING NEEDS OF ONLINE SEARCH SYSTEM USERS AS INFLUENCED BY SEARCH SYSTEMS EXPERIENCE

Background. System designers are becoming more and more concerned with the "naive" or "casual" user, i.e., user types who are unlikely to have the knowledge of, or take the time to learn, sophisticated system procedures. The design of information systems for these types of users poses a significant challenge, but an even greater challenge is the design of systems that can grow with the users as they gain experience with and/or knowledge about the system that they have started using. At some points, it is conjectured, many users may wish to change their approach to information system use and begin to exercise more sophisticated system options. This "maturation" process can vary across users and systems and may require that systems have at least two modes of operation or a continuum of complexity and sophistication, in order to serve both naive and casual users as well as sophisticated users. Some preliminary studies (Penniman, Fenichel, Wanger, Chapman) indicate that users with different levels of training and/or experience vary in system-use behavior. The proposed study would evaluate a single set of users over an extended period of time in order to evaluate changing behavior/needs as system-use experience increases.

Purpose and Objectives. Two research questions are posed in this study:

(1) How does user behavior change with respect to online system use as a function of experience gained with the system?

(2) What implications does any change in behavior have on system design?

The objective of this study is to answer these questions in a manner that can be applied to user interface system design, as well as to design of training programs for inexperienced, intermediate, and experienced users. In addition, it should be possible to evaluate the influence of intermittent or casual use on the user "maturation" process.

Methodology. The research method can be characterized as a controlled field survey (as opposed to controlled experiment or a regular field survey). A sample of users will be selected who are just being trained on a particular system (possibly a computer conferencing system with multiple modes of operation, or a retrieval system with different levels of command complexity). This group of subjects will be tracked over a fixed period of time (possibly 9-12 months) and their search behavior will be recorded. In addition, their attitudes towards the selected system and any other training or other system experience will be documented by means of a series of questionnaires administered over the test period. The results will be analyzed through time series analysis, and significant variables contributing to any observed change in search behavior or measured change in attitude will be sought.

The critical factors to be resolved in the study design are:

- System selection: should the system be one that has multiple levels of command structure or system complexity (e.g., EIES conferencing system, or DIALOG retrieval system)

- Number of subjects in sample: the sample size should be a function of the number of variables to be analyzed in each of two major categories (use behavior and attitude towards system use) and the confidence level desired for the selected analysis
- Attitudinal measures: a special-purpose instrument will be needed to quantify user attitudes toward system features. This instrument will need to be designed so that it can be reapplied two to three times during the course of the study.

The major phases of this project are:

Phase 1 (6 mos.): System/sample selection and instrument design. This phase will involve the review of several candidate systems/organizations and the selection of a single system for evaluation. An attitudinal instrument will be designed and the sample users will be selected.

Phase 2 (2 mos.): Sample subject measurement and training. During the normal course of user training for the systems, the users selected for study will be administered the preliminary attitude measurement instrument.

Phase 3 (12 mos.): Measurement of system use and attitudinal change over time. For the selected subjects a complete record of system use will be kept over time and the attitude instrument will be administered periodically.

Phase 4 (4 mos.): Data analysis and evaluation. The results will be reviewed and evaluated vis-a-vis design implications for future system design concepts.

The results of this study will be analyzed to provide system designers with insight into the changing needs/perceptions of users with respect to system features and the user interface. In addition, the methodology and instruments developed should provide system designers with tools they can apply to future system studies.

Cost. The estimated requirements to conduct this study are:

information scientist	1 FTE (24 mos., Phases 1,2,3,4)
behavioral scientist	.5 FTE (19 mos., Phase 1,4)
graduate assistant	2 FTE (24 mos., Phases 1,2,3,4)
secretary	.25 FTE (24 mos., Phases 1,2,3,4)

Additional expenses:

travel	$2,000
printing, postage, communications	2,000

References

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Penniman, W.D. "A stochastic process analysis of online users behavior." Proceedings of the American Society for Information Science. 1975: 12; 147-148.

Wanger, J., et al. Evaluation of the online search process: a final report. Santa Monica, CA, Cuadra Associates, Inc., 1980. Final Report under NLM contract N01-LM-8-4734.

PROJECT 31: IMPACT OF INFORMATION ON INDUSTRIAL PRODUCTIVITY

Background: Since 1972 the productivity growth rate of U.S. industries has dropped to only 1 percent per year, down from 3.2 percent per year in the period betwen 1948 and 1965. At the same time, our competitors in the world market have enjoyed increasing productivity growth rates (e.g., 5 percent per annum in Japan and 4 percent per annum in West Germany). This shift is causing serious concern among U.S. economists and policy makers since it affects our international balance of trade and the real value of goods and services produced and consumed domestically.

One part of the market, the information sector, is doing quite well. A recent Harvard study revealed that 25 percent of the total productivity growth in American industry is a result of the growth of information industries, and U.S. Department of Commerce statistics indicate that U.S. exports in telecommunications and information goods were responsible for 10 percent of overall U.S. merchandise exports in 1977.

Beginning with the benchmark studies of Machlup and Porat, a great deal of effort has gone into measuring the size and impact of the primary information industries (those that sell information goods and services to other firms, individuals, governments, etc.); yet very little has been done to measure the impact of information as an element of production. While many feel that there is a positive correlation between an investment in information goods and services and productivity growth, there are also data that suggest that, in some industries, the use of information technology may in fact contribute to productivity loss.

The two researchers who have come closest to analyzing information goods and services as an element of production are Edward F. Denison, who has approached the problem from the productivity side, and J.W. Kendrick, who found, in a study sponsored by the Organisation for Economic Co-operation and Development (OECD), that technological change was the major contributor to the growth of Total Factor Production (TFP) for the U.S. Business Economy between 1948 and 1978.

Purpose and Objectives: The overall goal of this project is to increase understanding about the impact of information goods and services on productivity by industry. The objectives of this research are:

- A comparison of growth rates of productivity in selected key industries with corresponding rates of investments and expenditures in information goods and services within those industries.

- A comparison of these data with matching industries in other selected industrial countries.

- An analysis of data on expenditures and productivity, to provide a cross-industrial and international comparison of growth rates of information-related investments and productivity.

On a conceptual level, this study will be of value to those who are interested in developing new economic theories. On a practical level, it will help corporate executives to make better investment decisions. We assume that a better understanding of the impact of information on industrial productivity would help strengthen our entire economy, thereby benefiting everyone in the U.S. in some way. More specifically, however, it would develop a body of knowledge and techniques that could conceivably be applied to library and information services in other environments.

Methodology: This research will test the hypothesis that changes in investments and expenditures for information goods and services are related to changes in productivity, and that this relationship can be revealed by comparing these variables over time, across industries, and between countries. This type of data collection and analysis is necessary, since productivity is the result of many variables and differs widely among industries.

The general approach is to collect data on productivity and investments in information goods and services by industry. This procedure will require a refinement of the definitions of productivity and information goods and services. In addition, industries must be selected with care and existing data examined to establish adequacy.

There is some indication that data collection may prove to be a problem, since data on investment in information goods and services by industry are not readily available. It may therefore be necessary to establish some subset of information expenditures, such as data processing equipment.

Industries should be selected on the basis of several criteria: (1) availability of data; (2) impact on U. S. balance of trade; and (3) variety. In any event, one industry should be in the high-technology category, one should be a service industry, and one should be agricultural.

It is expected that this research would be most successful if a multidisciplinary approach were taken. Clearly, it requires expertise in economics, information science and technology, management science, and public policy analysis. Care must be taken in the interpretation of the data collected, and the involvement of researchers with a wide variety of backgrounds will help preserve the proper perspective.

Cost: Approximately 3-person years should be required to refine the project and collect and analyze the data.

PROJECT 32: IMPACT OF PUBLIC LIBRARIES ON COMMUNITY PRODUCTIVITY

Background. Productivity is usually defined as either output per unit of input or output per worker-hour. It is a measure of the efficiency of the production function and is commonly used by firms, industries, and nations as an indication of economic health.

Defining productivity for the public sector has proved to be quite difficult, across the board. The definition of a unit of output is elusive, institutional constraints prohibit managers from reallocating resources, and inadequate data collection makes an analysis of input/output relationships impossible, in many instances. Nevertheless, taxpayers are demanding greater efficiency in government, and a few researchers are studying the problem of measuring local government productivity.

Community productivity is an even fuzzier notion, combining, as it does, the output of both public and private sectors within a given jurisdiction. In spite of data-collection problems, however, the concept may prove useful in conceptualizing the role of the public library and in discovering a way to measure its economic contribution.

There have been several studies that have dealt with the problem of measuring library effectiveness. By and large, these efforts have focused on the relationship between inputs (books, periodical subscriptions, staff, etc.) and outputs (circulation, reference questions answered, referrals, etc.). While this is a respected approach to the problem and enables us to compare libraries, it tells us little about the economic contribution that a library might make to a community.

Another approach is one that was first suggested in 1938 by Clarence Ridly and Herbert Simon. They suggested output measures for a variety of local government services, including libraries, and stressed efficiency measured in terms of consequences, rather than direct output. More recently, the Urban Institute, in conjunction with the National Commission on Productivity, undertook a four-part study of local government productivity and arrived at the same conclusion--that output should be measured in terms of consequences.

Purpose and Objectives: The goal of this research is to develop and test a model for measuring the impact of the public library on community productivity.

The objectives of this study are to:

- Identify all library outputs
- Identify all parts of the community effected by outputs
- Quantify impacts
- Compare the above with inputs to library
- Analyze and develop model

Direct immediate beneficiaries of the study will be library administrators.

This study will provide data that will be useful in making decisions concerning allocation of resources and in justifying them to library boards, local government administrators, etc. Long-term beneficiaries will be library users, who presumably will receive improved services in the areas of greatest need.

Methodology: If possible, this research should be conducted in conjunction with the Urban Institute or some similar agency. Every effort should be made to take advantage of techniques that have been developed to measure the productivity of other local government agencies.

Stage 1: Refine Methodology. Identification of all data collection points is critical to this research. While the usual service units mentioned above are obvious, the library may also make contributions in more passive ways. The presence of a library, for instance, may be a factor in attracting new business to the community. Use of the building by volunteer groups such as literacy instructors may also be a valuable service. The contribution of the library to a shadow economy in which goods and services are consumed directly and never enter the market should also be included.

Stage 2: Data Collection. This will undoubtedly require a survey that must be designed with great care and sensitivity. Asking people why they want information can be a touchy business. Telephone contact will not be overlooked and the community at large will be sampled to discover any economic impacts that may not be obvious from contact with users.

Stage 3: Analysis. Data collected will be analyzed and value will be assigned to various types of impacts. Comparisons will then be made with level of support in general and by type of service. For instance, some of the services that might be compared by level of productivity include: reference materials, best sellers, business services, historical material, films, reference services, referral services, and ancillary services such as literacy training.

Once the methodology is tested and a model developed, it would be most useful to replicate the study in several locations.

While productivity is certainly not the only goal of a public library, the findings may suggest a different allocation of resources and could help libraries to become more responsive to their constituencies.

Cost: If done properly, this should be a 2 to 3 year project conducted by a team of researchers with strong backgrounds in economics, library science, local government finance, and public policy analysis. It will require the active cooperation of the staff of the library and community leaders. The estimated level of effort is 3 professional person-years, plus appropriate clerical support.

PROJECT 37: CONSUMER BEHAVIOR RESEARCH APPLIED TO LIBRARIES

Background: The use of market research techniques by libraries to understand better the needs of users and potential users is regularly cited as having great potential payoff. Numerous user studies have been conducted, but the findings appear to contribute little to planned changes in services, resources, and management of the libraries conducting the surveys. This may be true because the findings often do not contribute useful new information. Community surveys on the use of public libraries tend to reconfirm what previous surveys found, going back to the classic study by Berelson in the late 1940's.

The concepts of marketing go far beyond the basic idea of describing the market, as in the case of most library surveys. The modern marketing concept stresses the identification of peoples' needs and offering products and services to satisfy those needs. This is generally contrasted to the earlier "product" orientation that most firms had. The product orientation assumed a fixed product, plentiful customers, and no marketing research or advertising. The next stage in the evolution of the modern marketing concept was the product orientation with the addition of selling and promotion. The focus was still on the product, with an increased effort to find customers for it. A few libraries are in this second state, but the bulk of them are still in stage one. Perhaps, a few have begun experimenting with the modern marketing concept.

An area that offers promise to libraries is consumer behavior. This relatively new field in marketing emphasizes the understanding of customer motivation and behavior. Consumer behavior is defined by Engel, Blackwell, and Kollat in their book, Consumer Behavior, as the "acts of individuals directly involved in obtaining and using economic goods and services, including the decision processes that precede and determine these acts." It provides an analytical framework for studying the behavior of users. Consumer behavior draws heavily from social psychology, sociology, and anthropology.

Purpose and Objectives: The purpose of this project is to review the field of consumer research, identify the most promising areas, and test applications in one community. An area of particular interest is the prediction of library user behavior on the basis of psychographic variables such as life style, attitudes, and behavior patterns. Research questions include:

(1) What are the most promising consumer behavior models for studying library user behavior?

(2) What is the most meaningful way to segment the community for library purposes?

(3) What is the likely effect of increased promotion of library services?

(4) What are the anticipated benefits from libraries becoming more marketing-oriented?

(5) How will citizens react to the adoption of marketing techniques

by libraries?

(6) What is the impact of marketing on library funding, organization, staffing?

Methodology: The study should be conducted in the following tasks:

(1) Review consumer behavior models.

(2) Adapt the most promising model to the library field.

(3) Prepare interim report discussing the review of consumer behavior models and the recommended model for library research.

(4) Test the model in a single library community

(5) Prepare report on the application of consumer-behavior models for library research.

The success of the proposed study depends to a large degree on the researchers' previous experience in consumer behavior. This kind of experience is a requirement for the project award.

Cost: The proposed project will require 2 1/2 to 3 person-years of professional effort.

PROJECT 47: A STUDY OF SELECTED ORGANIZED GROUPS WHICH ACTIVELY PROMOTE CENSORSHIP OF MATERIALS IN PUBLIC LIBRARIES AND SCHOOLS

Background: Reported censorship incidents in libraries and schools have increased greatly in the last few years. The ALA Office of Intellectual Freedom reported a five-fold increase in censorship complaints after the November 1980 election. Though this upsurge has leveled off at two or three times the normal complaint level, staff members express the feeling that these reported incidents represent a very small percentage of the censorship attempts that are ocurring throughout the country. They further indicate that the number of censorship reports they receive involving public libraries have grown from 10 percent to 20 to 30 percent in the last three years.

Major factors influencing the increase in censorship incidents appear to be organizational ability and sophisticated techniques used by national, state and local groups who promote censorship of materials in libraries and schools. Organizations of the New Right, such as the Moral Majority, have many resources at their disposal, which are targeted to remove materials that they find offensive from library shelves and the school.

Those who would prepare before the censor comes, as he/she/they surely will in this conservative climate, must be aware of how the censor operates and who he/she is in order to plan an effective strategy to counteract this insidious influence and promote intellectual freedom for everyone in a community. This study attempts to help librarians to gain the information necessary to develop more effective strategies.

Smelser's value-added stages of collective behavior is used as a basic framework for analyzing each stage in a censorship incident. These stages are: structural conduciveness, structural strain, growth and spread of a generalized belief, precipitating factors, mobilization for action, and the operation of social control.

Purpose and Objectives: The objectives of this research study are (1) to gather information about the characteristics, purposes, perceived tangible effects, and strategies of selected major organized pro censorship groups that have attempted to censor materials in public libraries and/or schools; (2) to assess selected demographic, social-psychological, political, and participatory characteristics of the leaders of this movement and to compare them with the same characteristics of leaders in anti-censorship organizations, to determine differences and similarities; (3) to identify the methods used to combat pro-censorship forces in particular localities; and (4) to ascertain whether censorship campaigns move through predictable stages, such as those specified by Smelser.

The following research questions will be studied in this investigation:

(1) What are the stated purposes, objectives, and top priorities of selected major pro-censorship organizations?

(2) What strategies have the pro-censorship organizations used to achieve their objectives?

(3) What tangible effects have pro-censorship organizations had on public libraries and schools?

(4) What differences and similarities exist in selected demographic, social-psychological, political, and participatory characteristics between leaders of pro- and anti-censorship groups? (Elements such as professional occupation, family orientation, view of society, political affiliation, education, religious persuasion, geographic location, and other related items will be considered as part of this question.)

(5) What methods have anti-censorship forces used to combat the pro-censorship groups when they have attempted to censor materials in a particular locale?

(6) To what degree do the censorship incidents examined reflect Smelser's value-added stages of collective behavior?

The direct intended beneficiaries of this study are those who attempt to promote intellectual freedom in public libraries and schools.

Methodology: This research study utilizes three basic field research techniques (document search, informal and unstructured interviews, and formal and structured interviews) to investigate selected pro-censorship organizations, their tactics and strategies, methods that have been used to combat these efforts, and differences and similarities between censors and non-censors. The study is patterned in part after the study by Zurcher and others entitled "Ad Hoc Antipornography Organizations and their Active Members," which was conducted for the Commission on Obscenity and Pornography.

The organizations and their leaders will be identified through two methods. First, the last year of the "Newsletter on Intellectual Freedom" and similar publications will be examined to determine which groups have been involved in censorship attempts. Second, experts on the topic will be asked to provide additional information about relevant organizations, their leaders, and other major participants in censorship incidents. A third group composed of people who have not been involved in pro- or anti-censorship campaigns will also be a part of this study.

Organizational documents, newspaper accounts, and other items will be employed to collect basic data to answer the research questions posed in this study. Unstructured and structured interviews will also be utilized to obtain needed information. These will be conducted with organization leaders and other major participants in censorship incidents. The structured interview items will be composed of informational inquiries and items assessing social-psychological characteristics that are drawn from various validated scales dealing with topics such as political intolerance and attitude toward censorship. The unstructured interviews will focus on eliciting information not obtained from other sources.

With few modifications this approach would be applicable to any environment where the abridgement of intellectual freedom is occurring through the efforts of an organized group.

Cost: This study will require one and one-half person years. Additional direct expenses will be incurred for interviews and document analysis.

References

Ruth Marcus, "Censorship in the Schools." The National Law Journal 3 (May 25, 1981): 1, 16, 20.

N.J. Smelser, Theory of Collective Behavior (New York: Free Press, 1962).

PROJECT 54: INFORMATION TRANSFER AT AN ONLINE REFERENCE DESK IN A PUBLIC LIBRARY SETTING--DESIGN CONSIDERATIONS FOR STAFF AND PATRON

Background: Mortimer Taube had some words of wisdom in 1964 on this subject, just before he died and just as MARC was being launched: "With computerization, the time has come to reassess our system and not to convert the 3x5 card into machine-readable form. We have failed to question our basic premises if we do not do this."

Others have also questioned the manner in which reference work in a library will progress, now that we have fee-based literature searching, online interlibrary loan, online circulation, and online catalogs. Some people have tried to analyze existing service and show all of this as a mere extension, while others have said that it will make a qualitative and substantive difference.

For anyone who can encompass the possibility of full-text searching of library collections, merged indexes of the book and journal collection, and direct user interaction with the circulation and catalog records, this new world of information transfer could spell the doom of the general reference desk in a public library. But is this really a definite possibility? Are there not some indispensable activities at the reference desk that cannot be met by all these new technological developments? Take reference service on the telephone, query negotiation, directory assistance, and short/quick question-and-answering. How can they be computer-aided?

Purpose and Objectives: Not for survey purposes, but for census purposes, it seems necessary to itemize and categorize the typical reference service activities in public libraries, to itemize and assess the development of possible machine-aided tools for these activities, and to suggest some means of developing a machine-based reference-service environment, complete with merged databases of more than bibliographic reference tools, possibly incorporating dictionaries, handbooks, and encyclopedias for ready online access and question-searching.

The objective of this research would be to understand what does and might exist at a public library reference desk if the full capability of the information industry were integrated and placed at the disposal of the reference staff and the patron. These data would provide the system designer with the specifications necessary to determine the extent of the task to be performed and the possible costs of designing a system with utility in general reference departments in public libraries in metropolitan areas, or possibly even all public libraries of a certain size with professional reference assistance.

Methodology:

(1) By review of the literature on reference service in public libraries, by compilation of statistics of these activities, and by case studies, develop a categorized census of the most cited reference works and user questions that reference staffs must respond to year after year.

(2) Check the availability of these works in machine-readable form and the economics of generating a combined database of these tools with retrieval capability superior to Channel 2000 (see OCLC report), New York Times Information Bank, NEXIS, and Paper Chase.

(3) Develop a prototype system that could exemplify the type of service possible at a reference desk by such an augmented reference collection. Tie this to an exissting circulation, catalog, and interlibrary lending system like that available at Ohio State University or the Columbus, Ohio public library, or any other possible site where an experienced public could be used as subjects. Even the Library of Congress clientele has some characteristics of a public library user community and the library might be a candidate site.

(4) Working with software specialists, human factors engineers, systems analysts, and librarians, develop the design specifications for a system that could handle 25 to 40 percent of the activity around a typical reference desk, including telephone inquiries.

(5) Have these design specifications reviewed by librarians and other information specialists from non-participating libraries who would be representative of the public library community that could be affected by these developments.

Cost: At least three years of effort by the Principal Investigator to steps 1 to 3. With consultants in the aforementioned fields (2 years FTE) and with clientele participation, conduct steps 3 and 4. Two to six months to do step 5.

References

American Library Association. *The Present Status and Future Prospect of Reference/Information Service*, (1967).

PROJECT 55: DIRECT AND QUICK INFORMATION RETRIEVAL SERVICE IN A SCHOOL SETTING

Background: In children is the hope of the world, or at least among them are the most adaptable to change, as witness their use of computers for games, mathematics problems, and possibly information retrieval.

Years ago a group at MIT experimented with a "knowledgeable information system" and a group of teen-age boys. They presented these boys with a typewriter console and microphone and told them they could ask any questions they liked. The information system (really a room of top-grade physicists and engineers in the next room) recorded their questions and tried to respond on the typewriter console. By this means the information system designers hoped to learn how people really want to ask questions and what we might have to do to answer them.

This proposed research could open up that interaction one more time, in a set of representative schools across the country, and the findings might tell us if the present menu-driven computer systems or new systems need to be designed for direct and quick question-answering systems for the general public, for children, for the next generation of Americans.

Purpose and Objectives: This study would provide valuable insight into the way young people ask questions, the topics in which they are interested, and how information services might be re-designed with the aid of computer-based information systems technology that could be piped into the home, the school, the library, etc. The limitations of the existing developments could be noted and some reflection and recommendations could suggest new avenues of research.

This study would be useful to system designers, librarians, information entrepreneurs, and eventually even the information seeker.

Methodology:

(1) Review and revise the experimental design of the original MIT study, taking into account existing capabilities and technologies.

(2) Prepare the identical research environment in several locations: metropolitan, suburban, rural, elementary and secondary levels.

(3) Gather data on these interactions and codify the similarities and necessary equipment for successful responses.

(4) Do failure analysis and user acceptance of the service.

(5) Develop a "wants" list for system development of a quick and direct user information service for the population aged 10 to 16. Incorporate in this any database developments that might be needed.

(6) Publicize the findings and shock a few people!

Cost: A two-year effort for the Principal Investigator; the equivalent of two years FTE for consultants who form the "invisible" information system; related costs for teams or transporting of research environment for at least four different locations; some computer costs; support staff for literature review, report writing, etc.

PROJECT 58: INFORMATION SEEKING IN HIGH AND LOW SCATTER FIELDS

Background: A provocative result appears in a study published nearly 20 years ago by Mote. He divided the scientific users of the Shell Thornton Research Centre Library (U.K.) into three groups according to whether their fields of research were low, medium, or high scatter. He defines low-scatter fields as those in "which the underlying principles are well developed, the literature is well organized, and the width of the subject area is fairly well defined" (p. 170). In high-scatter fields the number of different subjects is great and the organization of the literature is almost non-existent. The medium group falls in between, in degree of structure. With a sample totaling 178 people, he found that the average number of inquiries requiring 30 or or more minutes to answer per person during a three-year period was, for the low- to high-scatter groups, 1.4, 3.6, and 20 (yes, twenty!) respectively. No one in the first group made more than six inquiries and no one in the third group made fewer than 10. Mote also found the same pattern with under-30-minute requests studied in a smaller sampling over a three-month period. The differences in needs of members of these groups is striking.

I have long long felt that the Mote study deserved more attention than it got and was reminded of it again recently when the results of a study by Packer and Soergel appeared. In a study of 134 Canadian university chemists and chemical engineers, they examined the relationship between scatter of information and need for various forms of current awareness (CA). Their "tentative" results: scientists in high-scatter fields had their efficiency (success per time spent) increased by using selective dissemination of information (SDI), while those in low-scatter fields had their efficiency *decreased* by using SDI. Also, among the CA methods tested (e.g. scanning journals, reports from students), subscribing to an SDI service was the only one found to have any capacity to counteract scatter.

These studies suggest that degree of scatter may be a very important variable in determining researchers' information-seeking behavior. Degree of scatter may account for far more variance in search behavior than subject discipline, for example. (The latter has been exhaustively studied). These studies suggest that not only may there be differences in how scientists in the two types of field *do* seek information, but there may also be differences in how they *should* search, i.e. differences in optimal searching techniques. What is good for one may not be good for the other.

Despite the longstanding interest in literature scatter engendered by Samuel Bradford and all his successors, the impact of scatter on information-seeking behavior appears not to have been directly studied outside the research mentioned above. The extensive reviews by Meadows and by Garvey, for example, make no mention of scatter as a variable in studies of information-seeking behavior.

Purpose and Objectives: Two studies are proposed:

(1) A study of how people in low- and high-scatter fields *do* search

(2) A study comparatively testing methods of opitmizing information-gathering when the field is high- or low-scatter, i.e., testing how people *should* search. The Parker and Soergel study sug-

gested that there may be dramatically differently optimal information search strategies for people in high- and low-scatter fields.

The objectives of these studies are (1) to increase our scientific knowledge about this potentially important (i.e., influential) factor in information-seeking behavior, and (2) to determine, where possible, optimal seeking strategies for researchers in high- and low-scatter fields. With information from the latter study, particularly, scientists and librarians can be advised of optimal search techniques in the different circumstances addressed.

Methodology: Study 1: The possibilities here are virtually as rich as the possibilities for research on information-seeking behavior generally. Research on high and low scatter can be combined with study of people in different subject fields, applied vs. basic, early in career, vs. mature in field, etc. But before those are done, a study should first be carried out that provides a particularly strong test of the central question raised above: Do people in high-scatter fields exhibit different information-seeking behavior from people in low-scatter fields? So, in order to make that strong test, all factors should be as similar as possible except degree of scatter. This can be done by studying the information-seeking behavior of scientists in closely related fields--a "main line" central subfield within medicine, for example, against another medical subfield at the intersection of several others--the latter presumably showing high scatter. It would be desirable to use two pairs of fields, in case the chosen pair has unknown idiosyncrasies.

A measure of degree of scatter will have to be defined. This would be a particularly elegant study if such a measure could in fact be drawn from the work in bibliometrics on Bradford's Law of Scattering. (Neither Mote nor Packer and Soergel used a Bradford-like measure.)

A modest sample of researchers--say about 20--could be studied in each of the four fields. Researchers should also be drawn from more than one institution, to eliminate biases due to pecularities of the institutions or their personnel policies. The study should be at least modestly longitudinal, perhaps three months, using diary or periodic interview techniques, to get a sense of both the variety and amount of information seeking done.

Study 2: Since Packer and Soergel dealt with current awareness, it would be interesting to turn instead to retrospective information needs. Real information needs of people in high- and low-scatter fields should be used in the testing. It may be possible to gather some or all of the questions to be tested in the first study when the information-seeking is observed.

The basic approach in this study is to take two sets of real retrospective information needs, one set from people in high-scatter fields and one from people in low-scatter fields, and have experienced searchers search these questions by several methods. Specifically, all questions from both groups should be searched in online databases in the following ways:

Hypothesized as best strategy for low-scatter fields:

- Single most relevant database to subject of inquiry

One of these hypothesized as best strategy for high-scatter fields:

- Citation index database
- Multidisciplinary databases (e.g., NTIS)
- Several relevant databases
- Combine results of the above three in various ways to see if any combination is superior across questions or question types.

Ten to fifteen bibliographic questions should be searched from each of the four fields. Evaluation of output for relevance may be difficult. By combining all results and eliminating duplicates it may be possible to ask original requesters to give a one-time-only evaluation of all citations for relevance.

Cost:

Study 1: Diary or interview study of actual information-seeking behavior of researchers in two high-scatter and two low-scatter fields.

Study 2: Comparative study of search strategies to see which are most suitable for high- and low-scatter fields.

In using real search questions from the researchers in the first study, it might be desirable to phase the second study in parallel to the first, but beginning several months later. In this way researchers can be asked to give relevance evaluations (for study 2) shortly after the completion of the observation phase of study 1. The two studies would last a total of 15 months, each individually being 9 to 12 months long. Each of the M.L.S. staff members would be responsible primarily for work on one of the studies, and their time would be phased accordingly, one starting work several months after the other. The cost estimate below is for the two studies combined.

1 Ph.D. (P.I.) 40 percent time during academic year, 100 percent time in summer, 15 months

2 M.L.S. 100 percent time, 11 months each

1 to 2 Research Assistants, 40 percent time each

100 hours online database search time @ $100 per hour = $10,000

20,000 citations printed offline @ $.10 each = $2,000

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PROJECT 64: FROM CHILDHOOD TO ADOLESCENCE; CHANGING INFORMATION NEEDS

Background: School and children's librarians frequently comment on the sharp drop-off in reading activities and use of the library as children enter puberty, around the seventh or eighth grade. In part, this may be due to a larger variety of activities competing for their time. In part, it may be due to the psychological pressures brought on by bodily changes creating a degree of restlessness too high for a relative passive activity like reading.

Because of the possibilities and uncertainties in their environment at this time, it is a period when information-seeking activity may be potentially as high as it ever will be. There are numerous studies of information-seeking behavior in adults but only a very few studies that focus on children and on adolescents, in particular. These are often confined to reading and library use. One good example is the longitudinal study on Young People's Reading Habits done by the Centre for Research on User Studies at Sheffield, England. This project examined a sample of 60 young adults from the middle of the third year of secondary education to the end of the fourth year, and provided some useful information about the nature of their reading habits and preferences. For one thing, the researchers expected a decline in reading but did not find it. The proposed study would look more broadly at information-seeking behavior. The target population would also be adolescents, but three to four years younger than those in the Sheffield study.

Purpose and Objectives: Many people have commented on the value for young people of the "Dear Abby"-type of column in the newspaper. These columns, at best, help to clarify problems, provide factual information, assist the reader in becoming more objective about his/her problem, and provide emotional support. To what extent do adolescents in the age group under consideration make use of these columns as information sources? To what extent do they use recorded discourse from libraries, book stores, personal collections, etc.? To what extent do they find adult mentors? Or use peers?

Some children have good instruction on information-gathering in elementary school. To what extent do these children use these skills when faced with information needs?

What are the primary information needs of this adolescent group? We make a lot of assumptions about them. Every book on collection development for young adult libraries contains a set of categories. Adolescent counselors are accustomed to using another set of specified categories of concern. How do these coincide with the children's own perceptions of their information needs?

The objectives of the proposed research are to test empirically some of the assumptions about information needs in early adolescence and, in particular, to determine whether formal instruction on information-gathering makes a difference in strategies for obtaining information.

The target population is a relatively large sample (300 to 500) seventh and eighth grade children from a variety of settings: urban, suburban, and rural. The intended beneficiaries would be all who work with this age group and ultimately the children themselves, through the provision of more understanding and perhaps better-suited information services.

Methodology: An approach based on the work of Brenda Dervin (1) seems appropriate. Dervin suggests that information needs should be studied by focusing on the individual and the situations that confront the individual. She suggests that information is not a constant but rather a flexible term defined by the individual for him/herself. In this respect, Dervin makes a distinction between objective information, which describes external reality, and subjective information, which describes the meanings imputed to reality by people. She also uses situation analysis as a means for determining real information needs.

For this research, a modification of Dervin's questionnaire would be used, in particular, that aspect that deals with the analysis of situations. For each situation, the state of mind of the individual is assessed. It might be a decision state, where a choice among more than one alternative must be made. It might be a problem state, in which the individual knows what he wants but some obstacle or barrier stands in the way. It could be a worry state, in which the individual lacks control, or a comprehending state, where the person wishes to understand something. Information-seeking behavior is assessed by eliciting responses to five questions for each case where the individual tried to find out something, or learn, or come to understand.

(1) How hard was the information to find?

(2) How did you go about finding it?

(3) Did you succeed in finding it?

(4) Did finding it help?

(5) How did it help? Why didn't it help?

Additional information about the nature and extent of information-gathering and evaluation skills instruction that the individual had would also be collected.

The questionnaire would probably best be administered in personal interviews. A large [illegible] approximately 300 to 500 students, from a variety of settings will be a good approach for a first attempt. Later studies can look for differentiation among urban-rural, male-female, SES, and other demographic factors.

Cost: Two and one-half professional person-years, with appropriate clerical and technical support, plus two to three interviewers for six-month stints should be sufficient. Significant amounts of computer time for data analysis would also be required.

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(1) Dervin, Brenda, et al. The Development of Strategies for Dealing with the Information Needs of Urban Residents: Phase I - Citizen Survey. Final Report on Project #L0035JA, Grant #OEG-0-74-7308 to U.S. Dept. of Health, Education and Welfare, Office of Education, April 1976.

PROJECT 78: IMPACT OF THE "NEW LITERACY" ON THE "KNOWLEDGE GAP" BETWEEN DEMOGRAPHIC GROUPS

Background: Katzman (1974) and others have written about the "knowledge gap" between demographic groups in American and other societies where exposure to information media (although not entertainment media) is highly correlated with education and socioeconomic status. Some social researchers predict that the "knowledge gap" will be narrowed by the introduction of information media that require less processing skill than books, magazines, and newspapers. Other social researchers point to the fact that use of all information media is intercorrelated: the most active users of each new information medium are the active users of previous information media. Most empirical evidence supports the second point of view or "Matthew Effect" (taken from the Gospel of Matthew: to them who have, more shall be given).

The belief that radio and television would narrow the knowledge gap was founded on their universal accessibility. Even illiterate persons could gain information from these "first-generation" electronic media. In fact, however, the potential of radio and television to close the knowledge gap remained unfulfilled, because most persons on the "downside" of the knowledge gap did not choose to hear or watch information programs, while persons on the "upside" of the knowledge gap added such programs to their already-rich information diet.

The "second generation" electronic media of viewtext systems (see definition in Project 100, Appendix E) seem to offer little hope for narrowing the knowledge gap. These systems require not only literacy but a "new literacy" that combines reading skill with some understanding of computer-stored information files. The only evidence to the contrary is the fascination for all ages and demographic groups of computer games, some of which (e.g., Adventure and Star Trek) display full screens of text for the player to read and respond to. If radio and television failed to narrow the knowledge gap by making information more accessible, can viewtext systems succeed by making information more accessible and information-seeking more interesting?

Purpose and Objectives: Public-service stakeholders should be concerned about the equity implications of viewtext systems. If public funds are spent on projects such as converting community library files for viewtext distribution, will this only add to the riches of the information "haves," while not offering the information "have nots" more than a hypothetical benefit? Can viewtext services narrow the knowledge gap? If so, under what circumstances?

Methodology: Field research on the use and non-use of viewtext services is proposed. User studies recently completed (Harnish, 1981) or now underway (Paisley and Rogers, in progress) provide data for preliminary analyses to guide the subsequent research design.

Samples, instruments, and analyses must answer three related questions. First, does the decision to acquire viewtext home information services have demographic correlates? Second, do viewtext adopters make more use of other information media than viewtext non-adopters? Third, controlling statistically for other demographic and media-use variables, is there an increasing or decreasing knowledge gap (variance of knowledge means by demographic group) in communities where viewtext services have been extensively adopted for a period of a year or longer?

Survey data could be collected to answer the first two questions at this time. However, the preconditions of the third question will not be met until 1982 when several recently initiated viewtext systems pass their first birthday.

Once viewtext adoption reaches the level of 5 to 10 percent of all households, which may take another five years, broadly representative data bearing on the third question can be collected by placing one or two pages of questions on a national-sample "omnibus" survey.

Cost: Preliminary analyses of viewtext adoption, based on completed or ongoing studies: $25,000 (a good doctoral dissertation project). New survey data capable of addressing all three questions: $150,000. The professional person-year requirements are 0.5 and 1.0 years, respectively. Total cost: $265,000.

PROJECT 84: ECONOMIC VALUE OF INVESTMENT IN INFORMATION

Background: Over the past couple of years, I have been examining the economic value of information, first by applying "production models" (the Cobb-Douglas model in particular) to libraries and, second, by applying similar analyses to the Marc Porat data and related data on the "information economy." The results from those studies are clear, consistent and robust. They unequivocably show that there is a positive return to productivity and to profit from an investment in information services. They also show that U.S. industry is under-utilizing the information resources available. That is, the use of information in U.S. industry is significantly less than optimum.

These results, if they can be verified, extended, and applied, go a long way toward answering the question, "What's the value of information?" That question underlies every decision about investment in information resources, products and services. It will affect determination of natural priorities, investment by information entrepreneurs, and decisions by individual organizations about their internal information systems.

Purpose and Objectives: The purpose of the research is to establish a methodology for evaluation of the economic value of investment in information resources, products and services.

Methodology: The study approach is a continuation of the present methodology, in which the "input-output" statistics showing the purchases of each industry from every other industry are analyzed in the context of models for return to profit (or to "value-added" or to "contribution to gross national product"), to determine the effects of investment in different types of resources. The current results show the following:

> Given the internal investment, in capital and labor, in an industry, the return to added value from external purchases should be zero if those external purchases are being optimally used. (If the return to added value is positive, then one should purchase more; if it is negative, one should purchase less.)
>
> The current return to added value from purchases from the "information industries" is very positive, while the return from all other external purchases is zero.

These results need to be examined in detail for specific categories of industry, using much more detailed input-output data. They also need to be examined in terms of more specific breakouts of categories of "information industry" purchases.

The data are available from national industry statistics, for the U.S. and for other countries. Those data would need to be acquired, placed on a consistent basis, and analyzed. The analysis at this stage is quite straightforward and replicable from the present study approach. Other methods of analysis, designed to test the robustness of the results, the effects of different categorization of industry, etc., would need to be carried out.

The project is multidisciplinary by its nature, requiring economists as well as information scientists.

Cost: A level of four person-years, over a two-year period, should yield results that will test the validity of current results and, if valid, show their applicabillity.

PROJECT 94: COSTS AND COST ANALYSIS OF LIBRARY AND INFORMATION SERVICES
(Combines aspects of projects 17, 82 and 36)

Background: We need accurate, reliable, consistent cost data for internal management and inter-institutional comparison. We presently lack the accounting standards and practices for providing such data in libraries.

Purpose and Objectives: The purpose of this project is to establish standards for recording and reporting cost data in libraries. It draws upon the purpose and objectives reported in three component projects that are summarized in the following pages.

Methodology: Phase I is to establish standard accounting practices (see Projects 82 and 17). Phase II is to use them to establish standard unit costs. Phase III is to apply them to a particular type of management decision--the automation decision (see Project 36). These phases include:

(1) Review current relevant accounting practices and standards as they apply to these issues;

(2) Establish a task force of administrators, librarians, and cost analysts to identify elements of costs in specific library contexts;

(3) Establish a sample of representative libraries involving a cross-section of types and do an "ex-post-facto" allocation of costs to the standards, to establish benchmark values for those institutions;

(4) Have those institutions acquire data according to the standards. This will test the feasibility of the procedures and the comparability of results over time;

(5) Apply the resulting cost data to specific decisions, in particular to automation decisions.

Description of Component Projects

SUMMARY OF PROJECT 17: ELEMENTS OF COST IN THE PRODUCTION AND DISSEMINATION OF INFORMATION

Background: Techniques for the identification and measurement of unit costs are well developed throughout industry and society, and there is no reason to suppose that they will not fit at least some library functions. It is quite feasible, for example, to establish PERT charts for library operations, to establish critical path mechanisms, to establish productivity objectives and throughput criteria, and to monitor both quantity and quality concurrently, as is done in any well-organized production operation. That this has not happened has largely been attributed to the insistence of librarians that they were professionals who could not be treated in such a manner and that their work was too variable in nature to be quantifiable.

There are numerous indications that this is not the case. Some studies suggest that the amount of time spent on analysis has little, if any, relation to the quality of cataloging, at least in terms of retrievability. Some government and commercial information processing operations not only establish and enforce throughput standards and backlog maximums but do so with considerable quality control, despite varying input.

While the investigation of cost factors may not be applicable to some library operations, such as reference services, it can lead to improved efficiency and cost reductions in other areas.

Purpose and Objectives: This project seeks to determine a set of universally accepted procedures for collecting and projecting unit costs in libraries. Such standard per-unit costing techniques will provide crucial data for decision-makers and help point out the difference between cost and price.

Methodology: It is suggested that a task force of selected librarians and cost analysts identify and tag all of the elements of cost in specific library operations. These cost elements, once identified, should receive thorough professional review and critique within the library field. After this is completed, a group of representative libraries will collect cost data in a variety of production environments. These data, in turn, will serve as stimulus material for discussions concerning per-unit costs and cost-efficiency alternatives for each institution. On a larger scale, the study will yield useful information related to such national concerns as an interlibrary loan policy. Accurate determination of costs will influence not only decisions on centralization and decentralization but also decisions on whether to borrow or to buy. Such a determination can also suggest incentives to lenders to make the system more efficient.

Cost: This is seen not as one project but as a series of continuing projects that could last throughout the 1980's. The initial project--the identification and acceptance of cost elements in certain library operations such as technical processing, circulation, and interlibrary loan--can probably be completed through a review cycle in a period of 18 months, although it may take longer for discussion in various professional conferences and meetings. The initial 18-month study will cost anywhere from $100,000 to $350,000.

SUMMARY OF PROJECT 82: COST-ACCOUNTING STANDARDS

Background: Currently, data on the costs of library operations are difficult to obtain, inconsistent among institutions and over various time periods, and not based on any standards for accounting practice.

Various studies (such as the Palmour study of inter-library loan) have had to make assumptions about such things as "overhead allocation," even to establish realistic bases for comparing alternatives. Those assumptions may well have been valid, but decisions about the costs and benefits of alternative systems for library internal operations and information services obviously depend upon reliable, consistent, comparable, and widely accepted data on costs. Assumed values simply are not adequate.

Purpose and Objectives: The following kinds of questions are to be addressed in this project:

- What should be the standards for internal accounting for "overhead" in the costs of library operations? (This involves the handling of indirect labor, benefits, allocation of clerical and supervisory time, allocation of costs for space and utilities, etc.)
- What should be the basis for recording standard direct costs for library technical services and other internal library operations?
- What should be the basis for recording standard direct costs for library information services and other reader services (i.e., the "output" of the information activity)?
- What should be the basis of accounting for the capital investment in the information resources--the means for providing information products and services?
- What should be the basis for treating costs of library and information services, taken as a whole, in the accounting system of organizations within which they function?

Methodology: Three major steps are involved in carrying out this project. They each involve essentially "survey" (of present operations) and "review" (of the existing published material).

(1) Review of current industrial accounting practices and standards as they apply to these issues--either directly or analogously.
(2) Review of current accounting practices in libraries and other information activities, to establish present patterns and bench-mark cost data.
(3) Reconciliation of cost data as reported in the literature with the practices identified in (1) and (2).

Interdisciplinary work is involved to the extent that specialists in accounting will need to work with specialists in library and information services work.

Cost: 3 person-years.

SUMMARY OF PROJECT 36: DEVELOPMENT OF COST AND PERFORMANCE MODELS FOR EVALUATING LIBRARY AUTOMATION PROGRAMS

Background: Libraries of all types are faced with decisions about automating their operations. However, surprisingly little is known about the impact of automation on library operations based on systematic study. The inability to estimate the effects of automation on library operations is becoming even more critical with the introduction of integrated library systems. Management tools, based on systematic observation and study, are needed to assist library managers in these decisions.

Purpose and Objectives: The purpose of the project is to develop a series of mathematical models that could be useful in decision-making on library automation for the following library functions: acquisition, serials control, cataloging, catalog maintenance, circulation, reference, and interlibrary loan. The primary objective of a model should be its use in estimating the effects of automation on a specific library function. The models should also be linked, perhaps hierarchically, across one or more functions so that the effects of automating more than one function can be predicted. The models should be geared toward management needs and should be useful for all types of libraries. The models must be based on inputs that can be assembled by libraries without an inordinate amount of data collection.

Methodology: The study should begin with the selection and definitions of library functions. Each function should be analyzed in terms of its major activities and record files, and flow charts should be prepared. A review of the literature in the fields of library automation, business automation, and other computer-related areas should be conducted, concentrating on previously-developed models for evaluating automation programs. Tentative models will be developed and tested in several libraries that are considering automation. The product of the proposed study will be a manual on how to use the models. The study will also address how best to make available the computer programs of the models. It will ask, for example, whether it would be feasible to offer software packages for applications on microcomputers.

Cost: 3 professional person-years for a team with experience in mathematical modeling, library operations, and library automation. Other direct costs, including travel, online literature searches, and computer time, would add approximately $12,000, depending on the location of the test libraries.

PROJECT 97: RESEARCH ON THE DIFFUSION OF LIBRARY/INFORMATION RESEARCH AND INNOVATION (a combined project that encompasses a new project, 98, and projects 42, 26, and 23.)

Introduction

Since the beginning of post-war interest in the future of libraries and information systems (e.g. the Public Library Inquiry; Science, Government, and Information), extensive research has been condusted on many library/information topics, such as the users and uses of information, the management of libraries and information systems, and the application of computer and communication technologies in information services. This research has been supported by federal agencies, state and local governments, foundations, universities, professional associations, corporations, etc. Building on the research and also arising spontaneously in the field, many innovations in library/information service have also been developed, tested, and in some cases adopted widely by libraries and information systems.

Not much is known, however, about the diffusion of library/information research findings, models, and methods to other researchers, policymakers, educators, library/information system managers, and the interested public. Similarly, few studies have been conducted on the diffusion and adoption of library/information service innovations.

Three kinds of research projects on these topics are proposed:

(1) Research on the diffusion of library/information innovations. There is some consensus among diffusion researchers in other fields that "classic" diffusion studies have been deficient in two respects. First, they used a "top down" rather than a "bottom up" methodology and thereby overlooked processes of adaption and reinvention. Second, because of their early applications in fields like agriculture and medicine (primarily fields of "solo" practice), they overlooked the organizational factors that facilitate or impede innovation in bureaucracies, corporations, service organizations, etc. Accordingly, diffusion researchers are reformulating their studies as "botton up" tracer studies of where innovation occurs and why; they have also begun to measure formal and informal characteristics of organizations to provide additional explanatory variables. As yet, such studies have not been conducted in the library/information field.

(2) Research on the diffusion of library/information research findings. Research on library/information topics is conducted in research institutes, library/information science schools, corporations, etc. Most of the research is openly disseminated, whether in technical reports, journal articles, convention presentations, informal correspondence and conversation, etc. Other disciplines, some of them on the "border" of the library/information field, have been foci of research on the flow of research findings. The model for conducting a comprehensive study of such information

flow within a discipline or field continues to be the American Psychological Association's Project on Scientific Information Exchange in Psychology, which was completed more than ten years ago.

(3) Research on the diffusion of library/information research models and methods. From one-half decade to the next, library/information research is conducted in different ways. The power of some methods decreases over time; they are augmented or superseded. New models and methods of research are "imported" from other fields. There is a dynamic interplay among models, methods, findings, and applications. The process by which library/information research models and methods change over time has not been studied.

Four projects related to these research areas, proposed by several participants, are summarized below.

Description of Component Projects

SUMMARY OF PROJECT 98: ANALYSIS OF EFFECTIVE RESEARCHER-PRACTITIONER LINKAGES IN THE LIBRARY/INFORMATION FIELD

Background: The linkages that need to exist between researchers and practitioners for the sake of well-focused research and effective practice are very complex. An early model of researcher-to-practitioner communication has been discredited in many studies: researchers do not easily obtain the ear of practitioners, even when they try, and practitioners wish they had been consulted before decisions were made that affected the relevance and validity of studies.

According to the best research of other fields in which large practitioner constituencies are served by reseachers (e.g., education, agriculture), it is imperative to study linkages between researchers and practitioners as a system in which communication events, supported by a communication infrastructure, take place. In addition to events in which research findings are passed on to practitioners, there are "feedforward" as well as "feedback" events in which practitioners take the initiative to advise future reseach and critique past research.

Purpose and Objectives: While there are neither funds nor reseach personnel to undertake a comprehensive study of the structure and function of researcher-practitioner relationships, the alternative approach of conducting one or more "microcosm" studies has some merit. A "microcosm" study would map and describe the linkages between researchers and practitioners that occur either within a geographical area or within a shared area of research and practice, such as library automation.

Methodology: More specifically, the structure of the researcher-practitioner relationships would be mapped via social network methods, with as much attention as possible being given to both longitudinal and cross-sectional characteristics of the reseacher-practitioner networks. The function of sets of linkages would be analyzed from interview responses according to a taxonomy of functions (e.g., knowledge of specific findings, development of research or practice skills, feedforward, feedback, etc.)

Three or more geographical areas and three or more shared areas would provide valuable contrasts across the "microcosms".

Cost: 1 professional person-year. Data acquisition and analysis costs of $5,000 per area. Total: $75,000.

SUMMARY OF PROJECT 42: DIFFUSION OF INNOVATION IN LIBRARIANSHIP

Background: The major problem area that this project addresses is the lack of systematic planning and implementation strategies for bringing about the adoption of important innovations in librarianship. Worthwhile innovations and new services are often rejected because not enough attention has been given to ways of creating an environment that will be conducive to the adoption of innovation. The processes for successfully diffusing and utilizing innovations have been studied extensively in several fields, and much work has been done to attempt to develop methods to assess the adequacy of plans that have been incorporated into a project or program to promote desired changes. Title I of the Library Services and Construction Act (LSCA) lends itself particularly well to this type of investigation.

Purpose and Objectives: A major purpose of this study is to ascertain the extent to which library professionals who receive LSCA Title I funds have identified and used in their projects systematic ways of bringing about changes. A second purpose is to determine the importance that these library professionals attach to developing and implementing systematic plans for change to ensure maximum diffusion and use of new services and innovation. Finally, it is anticipated that this study will result in recommendations that will make library professionals participating in LSCA Title I projects more effective as change strategists.

The intended direct beneficiaries of this study are public library staff members who will be in a better position to act as change strategists. Indirect beneficiaries will be users of library services.

Methodology: Literature related to the change process will be investigated to develop the necessary framework and instruments for evaluating LSCA projects and for obtaining needed information from LSCA project personnel. Interviews with key project personnel of a nationally representative sample of LSCA Title I projects for the current year and for projects submitted during fiscal year 1978 will be conducted to obtain additional information about their attitudes toward incorporating change mechanisms in library projects, their awareness of research findings in this area, and their perspectives on the methods that have been used to promote adoption of their innovation.

The approach outlined for this study can be applied, with a minimum of modification, to other kinds of projects or programs and to clientele in different types of libraries. Once the framework and instruments pertaining to the change process are developed, they can be used to evaluate the role of various factors in the adoption of an innovation in librarianship and the plan that the change strategist has developed to bring about maximum diffusion and utilization.

Cost: 2 professional person-years, with additional funds for visits to selected project sites and telephone interviews.

SUMMARY OF PROJECT 26: "PATHFINDERS": THE DIFFUSION OF AN INFORMATION INNOVATION

Background: Innovation diffusion research concerns itself with the spread, by means of various channels of communication over a period of time, of a program, technique, or activity perceived as new. In a field such as library science, which is undergoing rapid change, it is important to determine efficient and effective means of diffusing new technological and non-technological programs, techniques, and activities of presumed benefit to the field's clientele.

Purpose and Objectives: The purpose of this project is to determine the stages through which an innovation in library practice passes and to identify the communication channels used in the diffusion process to facilitate future planned innovation and change in the field. The findings would be useful to government and professional association planners and to publishers, all of whom may need to communicate information about important new ideas and techniques throughout the library and information sciences community.

Methodology: This will be both an historical study, utilizing sociometric survey methods to trace the development and distribution of a particular innovation, and an active research study, to introduce the innovation into test sites and trace the diffusion from that point forward. The innovation chosen to be studied is the "Pathfinder," a step-by-step bibliographic tool that introduces its user to the variety of information sources available in a particular library on a particular subject.

The first phase of the study will attempt to determine the present stage of diffusion, i.e., awareness, interest, trial, adoption, confirmation or rejection, of the "Pathfinder" in library practice and, to the extent possible, the communication channels, i.e., professional literature, conference programs/workshops, student instruction, colleague interaction, publication distribution, etc., through which the innovation passed. People involved in the original "Pathfinder" development will be contacted and asked to recall whom they spoke to about "Pathfinders" and through what channels awareness and interest in them spread. After the first stage of data collection by telephone interviews, mail questionnaires will be sent to all individuals mentioned. A second round of questionnaires will be sent to people mentioned by the respondents to the first questionnaire. If warranted, a third round of questionnaires will also be sent. In addition, notices will be placed in journals to locate persons not named who have interest in, or who have adopted or rejected, "Pathfinders."

The second stage will introduce "Pathfinders" into four large libraries of different types and one library/information science school. During the next three years, representatives from these institutions will keep a log of activities associated with "Pathfinder" administrative (including promotion) and use activities. The final stage of the project will compare the paths of diffusion identified in Stage 1 (natural or spontaneous diffusion) and Stage 2 (planned diffusion).

Cost: An estimated 1.5 professional person-years over 5 years.

SUMMARY OF PROJECT 23: DIFFUSION OF SOCIAL/BEHAVIORAL SCIENCES RESEACH METHODS INTO INFORMATION SYSTEM/USE STUDIES (see also Project 22, Appendix E)

Background: This is a companion study to the identification and documentation of a collection of research methods from the social/behavioral sciences appropriate to information system/user studies (see Project #22). Too often after a study is conducted the results are presented in report form and made available only through one of the document distribution centers. This is too passive a system for widespread dissemination of results, particularly when a change in behavior (i.e., use of new research methods) is sought. Therefore, this study will focus on the active transfer of the research results of the (referred-to) companion project.

Purpose and Objectives: This study will evaluate a specially developed series of seminars as a means to transfer the research methods evaluated and presented in the companion study.

Methodology: The study will involve three phases and will draw upon the skills of technology transfer specialists. In Phase I (4 months), the "Research Methods Handbook" developed in the precursor study will be used as the core for development of a seminar series. The series will be promoted and presented in Phase II (6 months). Phase III (2 months) will involve evaluation of the seminar's effectiveness by means of appropriate follow-up techniques. The results of this evaluation will be used to develop recommendations to the sponsor for additional seminars and for enhancement to the "Research Methods Handbook."

Cost: 1.67 professional person-years. Additional expenses would include: promotional material and seminar expenses, $5,000; mailing and communication, $1,000; and travel, $2,500.

PROJECT 100: THE ROLE OF LIBRARIES IN CREATING AND PROVIDING VIEWTEXT INFORMATION SERVICES (a new project combining projects 79 and 80)

Introduction

A number of new electronic home information services have been introduced in the United States since 1975--the majority since 1980. Some of these services use teletext technology, defined as the transmission of text to television sets during the vertical blanking interval of the TV signal. In CEEFAX, the BBC's pioneering teletext service, four of the 625 video raster lines (British standard) are devoted to text; a 960-character page is transmitted in 0.24 seconds. Up to 250 pages of updated information are transmitted continuously in a cycle that repeats every minute (less-used pages are transmitted less often). A keypad and decoder permit the user to select and view a desired page when it comes along in the cycle.

Other services use videotex technology, defined as the transmission of user-selected pages via telephone, coaxial cable, fiberoptic cable, FM subcarrier, etc. Unlike teletext, videotex pages do not enter the transmission stream until a user has selected them through the keypad or full-keyboard terminal; the pages are then sent to that user alone. Whereas the number of available teletext pages is limited by the fact that all pages are retransmitted in cycles, the number of available videotex pages is limited only by computer memory. Several videotex systems have a planned capacity of more than a million pages, although none has reached that size yet.

Viewtext, the term chosen for this paper, is intended to encompass the following technologies:

(1) Teletext;

(2) Videotex;

(3) Bibliographic information retrieval, generally using telephone lines and full-keyboard terminals;

(4) Cartridge-, cassette-, or disc-format text files that can be displayed on personal computers or videodisc players.

Because of structural differences, these viewtext technologies have functional equivalence for some home information service applications but not for others.

Broadcasting and publishing corporations correctly perceive that viewtext services will displace some use of newspapers, magazines, radio, and television. They are hedging the economic threat by acquiring viewtext subsidiaries or buying substantial interests in them. The Reader's Digest acquisition of The Source, a nationwide telephone-based videotex service, is a well-publicized case in point. In other cases, broadcasting and publishing corporations are launching their own viewtext experiments. Dow Jones, Reuters, and CBS are among the corporations that have begun viewtext experiments in more than one community.

What about the community library, whose information services may be either augmented or displaced by viewtext? In the middle of 1981, only two viewtext experiments involving community libraries are being discussed. The Public Library of Columbus and Franklin County (Ohio) collaborated with OCLC (Online Computer Library Center) to provide a videotex library catalog to 200 Columbus households participating in the Channel 2000 experiment. In the follow-up survey, the Channel 2000 users ranked the library catalog second among all the videotex services as a motivation for subscribing to Channel 2000 or its successor in the future. However, it is noteworthy that the first-ranked service, a 21-volume, 32,000 article video encyclopedia, has the potential of displacing library services, as do the fourth-ranked and fifth-ranked services, the public information file and the community events calendar (the third-ranked service was home banking.)

A different collaboration is being tested in Washington, D.C., where community libraries are among the reception points for teletext transmissions over WETA-TV. Whether regular library patrons will use the teletext service and whether new patrons will be attracted to the libraries because of the service are important questions for the WETA-TV experiment to answer.

Description of Component Projects

SUMMARY OF PROJECT 79: ROLE OF THE COMMUNITY LIBRARY AS A VIEWTEXT INFORMATION PROVIDER

Background: Viewtext systems further reduce the small set of information resources that only libraries have been in a position to provide in most communities. Bibliographic citation files, video encyclopedias, news wires and financial services, consumer information, and even online reviews of books and the lively arts make it convenient for the viewtext user to bypass the library--or so he or she thinks. In fact many files in future viewtext systems may originate at the community library.

Purpose and Objectives: The proposed research will determine, for a sample of community libraries, the information resources they now hold--or could arrange to hold in the future--that would make a unique contribution to viewtext home information services in their communities. Presumably such resources include a computer catalog of their collections.

Methodology: The first phase of the proposed research will consist of as many as ten case studies of the "viewtext potential" of information resources held by a stratified sample of community libraries.

The second phase will consist of a mail questionnaire survey of a stratified sample of community libraries.

Cost: 0.5 professional person-year of effort will be required over a one-year period, divided equally between the first and second phases of the project. Data acquisition and analysis costs add $5,000 to the $30,000 personnel cost. Total: $35,000.

SUMMARY OF PROJECT 80: IMPACT OF VIEWTEXT SYSTEMS ON TRADITIONAL REFERENCE FUNCTIONS OF THE COMMUNITY LIBRARY

Background: The sight of a reference librarian at a computer terminal has become commonplace. In most cases the librarian is using one of the bibliographic retrieval systems to identify relevant documents for a patron. In a few years it will be commonplace for reference librarians to turn to their terminals for fact retrieval of all kinds. When online reference resources are fully developed, they will probably be logged into a special-purpose viewtext system designed for them by OCLC, RLG, or a similar research and development group. In the meantime they will be hard-pressed to pay commercial rates for services like CompuServe, The Source, Dow Jones, and Reuters. However, if they don't routinely use such services, they will fall behind their own patrons in "fact retrieval power."

Purpose and Objectives: The proposed research project will help to identify the viewtext information files of greatest usefulness to reference librarians in community libraries, based on an analysis of reference questions.

Methodology: Quantitative content analyses will be conducted of reference questions answered in a sample of community libraries. Some current samples of reference questions should be collected in order to determine the range of topics that patrons are now bringing to the reference desk, but most of the data for the content analysis can be extracted from a number of previous studies in this area.

When the samples of reference questions have been categorized by topic and by the required depth of the answers (e.g., single-source fact retrieval, multi-source fact retrieval, synthesis of partial information derived from multiple sources, etc.), this two-dimensional classification will be posed against detailed descriptions of the information files now being offered or planned by the ten or so major viewtext vendors.

Cost: 0.25 professional person-year plus 0.5 person-year of clerical assistance over a one-year period. Data acquisition and analysis costs are estimated at $2,500. Total: $15,000 + $10,000 + $2,500 = $27,500.

APPENDIX E

SUMMARIES OF OTHER PROPOSED PROJECTS

This Appendix contains summaries of the remaining universe of projects considered for inclusion in the Research Agenda. These summaries have been prepared by the project staff from original descriptions that were submitted by researchers in advance of the meeting and from those created by participants during the course of the meeting.

The summaries are presented in numeric order, for convenience in locating projects referenced by number in the text of this report, in Chapters IV and V.

SUMMARY OF PROJECT 01: THE IDENTIFICATION OF "BRIDGE PAPERS"

Background: Much of the literature in some disciplines is theoretical rather than practical and may be beyond the comprehension of the typical practitioner, with no immediate or obvious relevance to everyday problems encountered in that field. Nevertheless, one would hope that some reasonable portion of the research literature will eventually find applicability in the solution of practical problems. Moreover, one can hypothesize that there exist certain papers that tend to bridge the gap between research and application. An unpublished preliminary investigation of such contributions, or "bridge papers," in engineering confirmed that bridge papers can be subjectively identified ex post facto but was unable to identify any characteristics by which such papers could be predicted.

Purpose and Objectives: The purpose of this research is to determine the criteria by which bridge papers can be identified objectively as they are published. If this could be done, it would allow the implementation of some procedure whereby bridge papers are deliberately brought to the attention of practitioners. The potential advantages of this are that key applications--relevant contributions--would be highlighted rather than lost in the total mass of literature, and that the lag between theoretical studies and practical applications of research results might be greatly reduced.

Methodology: An empirically-based approach to identifying bridge papers in three diverse subject areas--e.g., engineering, medicine, and fuel technology--is proposed. In each field, several hundred leading practitioners would be mailed a brief questionnaire asking them to:

(1) confirm or reject the idea that identifiable bridge papers exist in their field;

(2) (if they confirm the idea) list what they consider to be the main characteristics of such papers;

(3) list papers that they would consider important bridge papers in their field.

The results would be collated to determine if any could be used to identify bridge papers objectively. Such characteristics might include:

- characteristics of author;
- institutional affiliation;
- type of source in which published;
- structural characteristics of paper (e.g., presence or absence or illustrations or equations)
- citation practice (e.g., early citation of a paper in research journal by an article in an application journal)
- any combination of these

Cost: 0.2 professional and 1 research assistant person-years.

SUMMARY OF PROJECT 02: THE MIGRATION FROM PRINT TO ELECTRONICS

Background: As more and more publications become accessible electronically as well as in print-on-paper form, it seems likely that a gradual but inevitable migration of use to the electronic version will occur. Already, some measurable migration has occurred. For example, there is evidence that some recently established libraries are foregoing subscriptions to printed publications for which an online equivalent exists. It seems reasonable to hypothesize that by 1982 there will be stronger evidence of migration in several sectors--including public libraries and personal consumers. Furthermore, if the full text of enough journal articles is available online, there may be some preliminary evidence of migration at the primary literature level by 1982.

Purpose and Objectives: It would be valuable to be able to measure the rate at which this migration is taking place. This could have a major impact on planning in the library community and the publishing industry. We also need to identify the major barriers to migration. These could include lack of an adequate terminal infrastructure, unwillingness of library administrators and funding agencies to substitute subsidized access to electronic sources for subsidized access to paper sources, and lack of "user friendliness" in present systems, which forces reliance on mediated rather than unmediated use of such systems. The purpose of the proposed study is to produce definitive answers to questions in these areas.

Methodology: A questionnaire will be mailed to large, random samples of (a) large public libraries, (b) large and small academic libraries, and (c) special libraries. Questions will include:

- Which online databases for which printed equivalents exist are used by the library?
- Does the library subscribe to the printed equivalent?
- How many subscriptions to printed services for which an online equivalent exists have been discontinued in the past five years?
- How much have the decisions to discontinue those subscriptions been influenced by the availability of the information in electronic form?
- What are the barriers to higher levels of migration?

Concurrently, recently established libraries will be contacted to determine the extent to which they subscribe to printed indexing/abstracting services or utilize online equivalents. Information on factors influencing their decisions will also be solicited. Finally, an attempt would be made, in conjunction with an information provider (The Source being the most likely candidate at the present time), to assess the extent of migration in the non-institutional sector. A questionnaire mailed to a random sample of non-library subscribers would be used to determine the extent to which their use of online information resources represents a move away from print on paper, e.g., fewer newspapers or financial services subscribed to.

Cost: One professional (0.5 person-year) and one research assistant (0.67 person-year), with appropriate clerical support.

SUMMARY OF PROJECT 05: THE ELECTRONIC CATALOG

Background: Many libraries are implementing online catalogs to replace the card catalog. These online catalogs, although they may offer more flexible search approaches, are little different from the card catalogs they replace. They use cataloging codes governing choice of headings, including AACR2, that are based on the supposition that catalogs must be organized for sequential alphabetic access and that points of access must be arranged linearly. Such linearity is completely alien to true electronic access, since names, titles, and other elements can be treated merely as character strings and searched on any word fragment. Thus, the questions arise: Shouldn't an electronic catalog be something different? Are cataloging codes needed in an electronic catalog? Going further, do we need cataloging at all if it is economically feasible to store some portion of the text of a book in machine-readable form?

Purpose and Objectives: The purpose of this project is to determine advantages, costs, and user acceptance factors associated with a catalog that makes no use of "cataloging." The following hypotheses are to guide the investigation:

(1) That more effective author/title access can be achieved by storing the front and back of the title page of each book than is achieved by present procedures.
(2) That this would yield enough descriptive detail on a book to serve most purposes.
(3) That storing the contents page in searchable form, along with a searchable title field, wll provide better subject access than that provided by present subject cataloging practices.

Methodology: The hypotheses would be tested empirically in a small library environment. Two parallel online catalogs would be developed, one a conventional version and the second non-conventional. The non-conventional version would store in searchable form the recto and verso of the title page of each book, together with its contents page(s), the "cataloging" data being captured by scanning the appropriate pages on a Kurzweil machine. The content indicators would be searchable in a full-text mode. Users would be given the ability to combine fragmentary data, e.g., a surname and a key word in a title. Evaluation of the catalog thus created vis-a-vis the more conventional online catalog would be achieved through:

(1) Task-oriented problems (e.g., find particular books or information on particular subjects) applied to both catalogs under controlled conditions. Success rates, problems encountered, and search times would be recorded.
(2) Questionnaires and interviews of library users to determine user success with, and reaction to, both catalogs.
(3) Comparative cost figures on construction, maintenance, and use of the two catalogs.

Cost: Variability in collection size and uncertainties on programming costs make estimation difficult. Minimum cost will be about $750,000.

SUMMARY OF PROJECT 06: THE LIBRARY WITHOUT WALLS

Background: Librarianship is perhaps the most institutionalized of all professions. In the eyes of the public, a librarian is "someone who works in a library" and librarianship is "what goes on in a library." The public does not recognize that professional librarians are specialists in the organization and retrieval of information. Librarians have tried hard to dispel the "custodian" image, with only limited success. One major reason is that the profession has placed too much emphasis on the library as an institution and not nearly enough on its major resource--the skilled professionals who work there. One could argue that most of the professional tasks that librarians perform could be performed outside the library. Indeed, one could argue that the future of library service lies outside the library.

Purpose and Objectives: The survival of the library profession depends on its ability and willingness to change emphasis and image. Since physical facilities and resources must inevitably decline in importance as more and more information resources in electronic form are utilized, the profession can survive only if it shifts its emphasis to the technical expertise of its practitioners. This whole idea of the de-institutionalized librarian and the "library without walls" is the focus of this research.

Methodology: A large-scale demonstration project in one community is proposed. The project will focus on services that the librarian, as a technical specialist, can provide for the community. The librarians in the project will work in the community, rather than in the library, using the local library collection as one of many information resources.

Because this is a radical departure from "conventional" library service, it is difficult to be precise on what the de-institutionalized librarian will actually do. Indeed, the identification of viable activities and experimentation with these is the whole purpose of the project. The services provided by the librarian probably will not differ from those now offered. However, the form of delivery will differ. Technological capabilities will be used whenever these seem appropriate to a particular type of service. The desired end result is simply a higher level of professional service to the community.

While this is a demonstration project, it will also seek answers to questions such as the following:

- How can sophisticated communications technology be used effectively in a library service program?
- How do people who have always used libraries react to new forms of service?
- How do people who have never (or rarely) used libraries react to new forms of service delivery?
- How does the professional role of the librarian change in a program emphasizing the library as "function?"
- To what extent can the library as "function" be detached from the library as "place?"

Cost: About $2,250,000 over three years.

SUMMARY OF PROJECT 07: INFORMATION SEEKING PATTERNS OF THE "INFORMATION POOR"

Background: Information is a national resource which should be accessible to all citizens. For various reasons, however, the "information poor" (defined as culturally or educationally disadvantaged groups such as the poor, the elderly, the handicapped, the imprisoned, and racial/ethnic minorities) have been excluded from the enjoyment of this resource. The White House Conference on Library and Information Services in November 1979 assigned a high priority to the plight of the information poor, passing resolutions urging information science professionals to press on with research in this area as a step toward effective reform.

Purpose and Objectives: The primary purpose of the proposed research is to identify both the occupational and non-occupational needs of the special population groups (SPGs) which comprise the information poor. Specifically, its objectives are:

(1) To ascertain the information requirements of each SPG;

(2) To examine the perceived level of satisfaction of citizens of the SPG with information source providers: interpersonal, institutional (including libraries), and mass;

(3) To develop a taxonomy of barriers to effective information access.

Methodology: For a study of this type, the most common format is the generalized survey or poll. It is necessary, however, to consider the unique complications related to the study of these SPGs and to modify the general methodologies accordingly. For example:

- Each of the SPGs has its own specialized characteristics and, likewise, specialized information needs and information-seeking patterns.

- For the same reason that many of these groups are denied access to public information resources, they are difficult to reach through the common questionnaire approach.

- The ability of the information poor to articulate their own information needs and information seeking patterns will almost surely be less than that of other groups.

Cost: The cost of this project will be a function of such variables as the number of SPGs to be studied, the size of sample populations, and the technique selected to perform the study. It is anticipated that the level of effort will be at least 3 professional person-years.

SUMMARY OF PROJECT 08: INFORMATION SEEKING PATTERNS OF THE "STUDENTS"

Background: In the face of severe and potentially traumatic budget cuts, it it is vital that libraries, both public and school-affiliated, learn to maximize the use of limited resources to provide only those services that are most essential to their continued effectiveness in serving their primary clientele. Recently, certain public libraries, such as in Boston, suggested a plan whereby college students would be charged for the use of public library services and resources. In light of the emergence of this strategy as a possible way to relieve fiscal pressure, there is clearly a need for accurate and complete base-line data, first, on the information needs and requirements of students, and second, on the role of various libraries in relation to these needs and to other information source providers.

Purpose and Objectives: The primary purpose of the proposed research is to identify both the occupational and non-occupational needs of students, concentrating upon the identification of information needs and characteristics. The specific objectives are:

(1) To ascertain the information requirements of students

(2) To examine students' perceived levels of satisfaction with information source providers: interpersonal, institutional (including libraries), and mass

(3) To determine a taxonomy of barriers to effective information seeking

Methodology: The most commonly used technique in studies similar to this is the survey or poll. For a survey of the information needs of students, however, the techniques employed must take into consideration the specialized problems involved in the attempt to investigate each special subgroup. Since the umbrella classification of "student" includes a number of significantly different subgroups (pertaining to age, level of education, sex, race, etc.), the study must be sufficiently broad so as not to exclude certain subgroups from the final statistics. The ability of students (defined here to include children from 6 to 16), especially the very young, to articulate accurately their needs and information seeking patterns will almost certainly be less than that of older individuals. Therefore, techniques such as questionnaires and phone interviews will not be effective for all subgroups. Furthermore, the actual contents of the survey instruments used for each subgroup will have to be modified to reflect the extreme differences in student subgroups in terms of intellectual development and sophistication.

It is proposed, therefore, that the study be conducted either at the state or regional level and that the project deal with a viable and statistically significant cross-section of the student population.

Cost: About 2 professional person-years.

SUMMARY OF PROJECT 10: DYNAMIC AND CYCLIC MODEL OF INFORMATION SYSTEMS

Background: From an economic point of view, the course of information flow is a complex cycle consisting of a myriad of macro- and micro-sectors and sub-cycles. If we are to understand the whole, we must understand its parts. To deal with the cost-related problems of information flow, it is essential that we delineate the macro- and micro-substructures and expose their effects upon the functioning of the whole cycle, exploring the cost-oriented aspects of each operation and examining each individual input/output relation with a structural-systemic perspective using detailed and comprehensive economic models.

Purpose and Objectives: The proposed research in intended to emphasize the widespread influence of economic forces, potentials, and limitations on continuous flow of information, the specific purpose being to formulate an inclusive, incisive, and analytic economic model of the dynamic and cyclic information system. With such a model, information scientists could achieve a broader and more profound knowledge of and control over the generation and dissemination of innovative ideas.

The project objectives include:

- identification of macro- and micro-structures in the system of information flow
- investigation of the interaction between various substructures
- identification and examination of problems and bottlenecks in the cycle
- development of conceptual tools with which to predict costs of alternative practices and assess the effectiveness of information delivery systems

Methodology: The research plan will be divided into three phases. Phase I is a structural study of the present system. Phase II is a modeling analysis of this system. Phase III is an economic analysis of alternative systems.

The research methodology will include the following steps:

(1) exhaustive literature search
(2) identification and collection of all pertinent information and data
(3) structural study of the information system
(4) formulation of hypotheses
(5) conception of a formal model
(6) testing of hypotheses
(7) development of an actual model
(8) testing of model
(9) reporting of results and recommendations

The project is expected to use all available modeling methodologies specifically suited to policy modeling, paying particular attention to those of linear economics, operations research, system dynamics, and econometric modeling. In addition, a number of more specific dynamic, socio-economic models will have to be considered.

Cost: At least 3 professional person-years.

SUMMARY OF PROJECT 12: EXPANDING LIBRARY AND INFORMATION SERVICES: FEASIBILITY AND POTENTIAL IMPACT OF COMMUNITY-RELATED SERVICES

Background: Community-related information services have been expanding rapidly in all areas. Examples of such services include information acquisition and organization, active information dissemination, coordination of a network of diverse information resources, publications, counseling, mediation, advocacy, lobbying, and direct political action. While libraries have been identified primarily with the first four areas, librarians have begun to be more involved in all of these. But what is the library's role in these activities? What types of activities are feasible and desirable for them, and which are not? In these times of uncertainty, when libraries must compete with other essential public services for scarce tax dollars, they must become more receptive to the needs of the information-seeking public. The need for community-related services will have a strong impact on deciding the new directions of library and information services.

Purpose and Objectives: The purpose of the study is to support the effort to make library systems more flexible, resilient, responsive, relevant and thus more fiscally viable. The objective is to delineate in detail the variety of modes and techniques that can be/have been used to achieve responsiveness. It is hoped that this study will help to improve and upgrade library services through an updated outlook for library managers, a new public image for libraries, expanded services and roles for public information source providers, and increased funding for more responsive libraries.

Methodology: This study should be viewed as a pilot project, uncovering and synthesizing existing data and/or information and laying the groundwork for future research in this field. Though the research is not rigorous, it comprises a necessary first step, making later in-depth studies possible.

Several basic steps can be foreseen in such a project. It is crucial, first, to establish macro- and micro-structures and an overall purpose and plan of the project by answering some fundamental questions, including:

- What other organizations/institutions provide community information sources?
- Which of these are most relevant to the question of library expansion?
- Which of these could be potential partners with libraries?
- What makes institutions successful as alternative information source providers?
- What services currently available from organizational-institutional sources could be provided by libraries?

An exhaustive literature search of all related topics will be conducted. All pertinent documents and information sources will be compiled, cataloged, classified, and synthesized into a manageable and accessible volume. Finally, areas that emerge as deserving special attention will be outlined and clarified.

Cost: At least 1.5 professional person-years.

SUMMARY OF PROJECT 13: ACADEMICIANS AND THEIR PREFERRED INFORMATION APPROACHES

Background: We know virtually nothing about how people want and need information. Most work in this area has consisted of so-called library user studies that have typically used questionnaires that sought to confirm present practices from present users. No attempt has been made to differentiate between what users need (something they may themselves be unaware of), what they want, what they ask for (already a reflection of what they consider a reasonable request to make), and what they are willing to settle for. It is also clear that many library users, particularly in academia, expect no information service as such. What they expect, what they ask for, and what they get, is document delivery. But what do they really prefer? And what do they need?

Purpose and Objectives: The purpose of this project is to plow through the layers of guilt, defensiveness, and entrenched expectations to determine what information services academicians really need, rather than what they want or expect to get from the library. The objective is to help determine priorities for libraries in meeting the needs of academicians.

Methodology: The study will use full-day (or longer) interviews of academicians from a variety of disciplines and organizational settings (e.g., two- and four-year colleges). The questions, which should not concentrate on the library at all but, rather, on the individual's own work, could include:

- What do you do?
- How do you do it?
- What are your problems and hang-ups?
- What do you wish you could have, no matter how unreasonable you think the wish might be?
- If you could be provided with a variety of services to be enumerated, how helpful would this be?
- To what extent would it depend on your confidence in the education and qualification of the individual providing the service?
- If you were provided a single contact, how well could you work together?
- To what extent are your responses constrained by fear of appearing out of phase with the ethics of your own field?

The responses to these and other questions will be analyzed, reviewed by reaction panels, and published in a report. This methodology can then be applied to library users and non-users in other communities.

Cost: Approximately $250,000.

SUMMARY OF PROJECT 14: CASE STUDIES TO DETERMINE THE IMPACT OF INFORMATION AVAILABILITY

Background: The benefits received from library services on a continuing basis are difficult to determine. Although one can point to anecdotal evidence of saving time and money by using library services, it is next to impossible to "prove" the value of the library's information and services. First of all, information not obtained from the library can be obtained from other sources, perhaps even from other library users who neglect to give the library credit. Secondly, it is not possible to set up controlled experiments in which certain users would be permitted access to information sources and others would be deprived. Finally, while it may indeed be possible to get individuals to agree that the library has been valuable to them, it is more difficult to get them to agree that without the library they would have failed. It is equally difficult to quantify the value of the library service to the user.

Purpose and Objectives: The purpose and objective of this effort is to provide some indication of the value of library and information services on the life, work, and accomplishments of specific end users or of information service professionals who serve as intermediaries between the library and the end user.

Methodology: A case study approach is proposed. Two groups will be selected: one a group of individuals who work in the absence of information sources, the other a group whose members have access to information resources. Members of the first group will be interviewed in depth after the completion of specific study efforts to determine and document how they determined their need for and the availability of information, what tools and individuals were brought into the process, the successes and frustrations encountered, and the ultimate outcome.

The second group will be asked to chart their own methods and progress throughout the test period to determine what use is made of available library services and resources, when they were and were not used and why, and the results achieved. The investigation should include scholars, researchers, political and community leaders, business executives, and a cross-section of general public library users. The methodology to be employed will have to lean heavily on other disciplines, including sociology and psychology.

Cost: Cannot be attempted without additional input on the establishment of adequate samples, inquiry methodology, and response analysis criteria from researchers in other disciplines. Each case study would probably cost $50,000-60,000.

SUMMARY OF PROJECT 15: THE LIBRARY AS A PRODUCTION ORGANZATION

Background: In the past decade, some librarians have begun to examine the library as an organization, and some library schools have stressed management concepts as they particularly and uniquely apply to libraries. Nevertheless, measurements in libraries have not truly involved criteria central to the mission of the organization. Recently, a new and disturbing element has broached this vacuum. Funding bodies concerned about establishing priorities, and government agencies and foundations anxious to provide tools for such examinations, have begun to fund studies undertaken by operations researchers and economists to determine the "effectiveness" of the library. As a result of all this, we now have economic feasibility studies that "tell" governing boards which of their libraries are the most effective and should be retained and which can be curtailed or closed. They do this primarily through the measurement of circulation and the application of that easily derived statistic to various operational costs. In other words, these studies assume that the purpose of the library is to generate circulation and that branches should be opened or closed on the on the basis of their success in achieving this objective.

Librarians have objected heatedly to the development of such simplistic measures for effectiveness. Economists and statisticians have responded, quite reasonably, that if this is not what librarians want them to measure, what do they want measured?

Purpose and Objectives: The purpose of this project is to identify criteria for evaluating library performance and making projections about future directions in times of growth, retrenchment and shifting priorities.

Methodology: The proposed study approach consists of several steps. First, an intensive literature search will be undertaken to uncover relevant activities in this and other fields. Management analysts open to new ideas and willing to adapt their techniques to library needs will be asked to study the problem. In addition, groups of distinguished librarians will be asked to identify, perhaps using the Delphi technique, critical areas that should be measured and evaluated to determine effectiveness of library services and priorities. After the narrowing of focus achieved through the Delphi technique, a meeting to produce specific recommendations will be held.

Cost: This type of study could be undertaken for one group of libraries (e.g., small academic libraries) over a period of 24 months for a cost of approximately $250,000 to $350,000.

SUMMARY OF PROJECT 16: DETERMINING AND ASSURING THE QUALITY OF INFORMATION SERVICES

Background: Concerns for the assurance of standards of quality of performance can at times create contradictory pressures, and the concentration on the fulfillment of one need can in turn produce or aggravate another. For example, insistence on the assurance of accurate document analysis (cataloging) can give rise to a deterioration in another qualitative concern--the rapidity of material preparation for use. Put into its simplest terms, is it more important to analyze material well, no matter how long it takes, or to prepare it rapidly, doing the best qualitative job that can be done? (There is also the option of purchasing less, particularly if there is little likelihood of use.) As a second example, studies of acquisitions policy shifts during the 1970's show that major academic libraries attempted to protect the "qualitative concern" of collection integrity and continuity, in large part by eliminating or severely curtailing the acquisition of duplicates in the collection. In doing this, they may have turned their backs on another qualitative standard--delivery of materials upon request. As a third and final example, different methods for shelf storage (e.g., by author, by classification number, by accession number) offer different--and conflicting--qualitative advantages. An author arrangement allows for direct access to works; a classified arrangement facilitates subject browsing but requires an intermediate step to determine the appropriate classification number; and an arrangement by accession number uses space most efficiently but precludes direct access as well as browsing.

Purpose and Objectives: The basic purpose of this research is to study user needs for access to library materials and the ways in which the organization of the collection, and the finding tools provided by the library, really help to meet those needs.

Methodology: The several study approaches implied in the background statement are not at all clear, except that one needs to focus first on the services needed. (These are not necessarily the services asked for.) Only after we have determined information service needs can we examine alternative ways of implementing the required services, using ranking techniques to determine what can or cannot be afforded. Initially, the study needs to examine use patterns and user needs--for example, the use of the catalog. The results of catalog-use patterns would then be compared to other patterns of subject access. For example, do users head for the shelves or for the catalog? Do our classification systems keep their material together or must they move throughout the collection because their needs are cross-disciplinary (at least as we have defined them)? How much browsing do people do in various types of libraries, and what would be lost if the opportunity for browsing were eliminated?

This is only one approach for one of the issues identified. Others, similar and yet different, would have to be devised for some of the other alternative issues raised.

Cost: Since project costs will depend on the approach taken, an estimate is difficult to provide. A very rough cost estimate for the study outlined above would be $100,000 over a period of 18 months.

SUMMARY OF PROJECT 20: ADAPTIVE PROMPTING--A METHOD FOR INTELLIGENTLY INTERVENING IN USER-SYSTEM INTERACTION

Background: There has been a great deal of talk about novice or untrained users searching databases through online systems, but intermediaries continue to provide most of the interfaces between the end user and the systems. While While there are many reasons why people do not embrace an innovation such as online searching, the system itself generally provides little encouragement to the beginning user. For example, while error messages are not openly hostile, they seldom provide suggestions for how to correct errors. There is also a class of errors that is not detected at all by most systems. This type of error contains no single action that is incorrect but, when the series of actions or protocol is viewed in its entirety, there are indications that the user needs help.

Adaptive prompting is basically a context-sensitive method of issuing diagnostics. Because the context (i.e., what the user has done during the session) is evaluated, the diagnostics are based on patterns of actions, as well as individual actions. The proposed approach can be considered a form of synergism, in that the sum of the interactions is at least different from (if not greater than) the individual components.

Purpose and Objectives: The proposed research will continue development of adaptive prompting as a technique for improving user-system interactions and will apply this technique to a single online system with significant potential for naive or casual user interaction (i.e., an online public user library catalog). Two research questions are posed in this study:

(1) How can non-productive user interaction be characterized by means of online monitor data analysis in real time?

(2) What diagnostic and prompting techniques can be derived from such real-time analysis?

The objective is to develop a prototype adaptive prompting interface, based on actual user behavior captured through online monitoring and capable of residing in a microcomputer front-end to a large interactive system, or possibly in an intelligent terminal.

Methodology: The research method is empirical. Data captured through an online monitor on a public-use system will be analyzed for patterns of typical "correct" and "incorrect" behavior. The data will be used to derive algoriths that can operate on a microcomputer to screen user-system interaction in real-time. A prototype "prompter" will be developed, with error messages and diagnostics coupled with the error-detection algorithms so that the total system will consist of error-detection and error-correction processes.

The project will have three phases. Phase I involves system selection, data collection, and data analysis. The analysis of Phase I data will lead, in Phase II, to algorithm development for real-time error detection. In Phase III, a prototype prompter will be developed with associated error messages and diagnostics to operate on a microcomputer situated between the system and the user.

Cost: 4.67 professional, 4 research assistant, and 0.5 clerical person-years. Additional expenses: $6,000 for computer processing and $500 for duplication and communication.

SUMMARY OF PROJECT 22: DEVELOPMENT OF A HANDBOOK OF METHODS FROM THE SOCIAL AND BEHAVIORAL SCIENCES APPROPRIATE TO INFORMATION SYSTEM/USER STUDIES

Background: While information science has been struggling over the years with the development of theories and techniques to establish itself as a legitimate discipline, it has for the most part overlooked the tremendous store of research techniques already developed in other disciplines. There is a need for a practical research and teaching resource handbook of methodologies focusing on user/system interaction and drawing from the social and behavioral sciences for proven tools.

Purpose and Objectives: There are three research questions to be addressed in this proposed study:

(1) What established data collection/evaluation techniques exist in the social/behavioral sciences that can be applied directly to current needs in information science?

(2) What is the basic information required for each of these techniques to describe it adequately for use by information scientists?

(3) What is the appropriate method for presenting this information in handbook form?

The objective of the study is to answer these questions and to produce a handbook of data collection/evaluation techniques based on the resulting answers. The beneficiaries of this study will be information system researchers, designers, and operators who have a need to:

- develop and test new theories
- develop and test new systems
- maintain and enhance current systems.

Methodology: The study will involve three phases. Phase I (8 months) involves the identification and screening of data collection/ evaluation techniques through an extensive literature search and a survey of selected researchers. Phase II (4 months) involves formulation, by a panel of experts, of basic information requirements for presentation of techniques to an information system research/designer audience. Phase III (6 months) involves the Production of a handbook incorporating the content requirements established in Phase II.

Cost: 3.2 professional, 1.5 research assistant, and 0.75 clerical person-years. Additional expenses:

literature searches, interlibrary loan, and facsimile/copyright charges	$2,000
computer conferencing	$3,500
postage, printing, artwork, and misc.	$4,000

SUMMARY OF PROJECT 24: UTILITY OF THE UNOBTRUSIVE PARTICIPANT OBSERVER TECHNIQUE IN THE STUDY OF INFORMATION-SEEKING BEHAVIOR

Background: The variables associated with information-seeking behavior are difficult to define, isolate, and measure. In fact, it has not been demonstrated that all variables relevant to information-seeking behavior have been identified, much less defined. Different methodologies for gathering data related to information-seeking behavior need to be applied in areas where studies have previously been completed and techniques that have not previously been applied in studying information-seeking behavior need to be tested.

Purpose and Objectives: The purpose of this study is to determine whether the unobtrusive participant observer technique, which has proved useful in anthropology and sociology, is a useful research methodology through which to identify variables relevant to information-seeking behavior. The project would focus on the identification of relevant variables, their definition, and their subsequent classification. The immediate beneficiaries of this research would be those who design studies of information-seeking behavior. Intermediate beneficiaries would be the designers of information systems, with the end beneficiaries being those who utilize information systems.

Methodology: This study proposes to place an unobtrusive participant observer in a department (sociology, for example) of a major university. The researcher would be knowledgeable in three areas: the unobtrusive participant observer methodology, information-seeking behavior, and the sociology of knowledge. The researcher would spend one summer term, plus one full academic year and a subsequent summer term, ostensibly as a full-time doctoral student but actually studying the information-seeking behavior of students, faculty, and research associates in the department. The first summer would be used to familiarize the researcher with the university environment, available information systems, etc. The academic year would be devoted to observing the behavior of persons in the department, concentrating on identifying the behavioral and environmental variables that affect information-seeking behavior. The subsequent summer would be spent describing and defining the identified variables, classifying them, and integrating them with those previously identified in research on information-seeking behavior.

Cost: A pilot project at one site utilizing one sociology of knowledge instructor and one instructor in the research technique, plus one field researcher, would entail 2.25 professional person-years. Expenses would include the tuition and living expenses of the field researcher. Using a library and information science doctoral student and faculty instructors for such a study could help keep the costs down.

SUMMARY OF PROJECT 25: EFFECT OF PUBLIC LIBRARY SUMMER READING PROGRAMS ON READING LEVEL RETENTION OF UPPER PRIMARY GRADE STUDENTS

Background: Many services and programs of public libraries are predicated upon matters of faith, rather than fact, and upon traditional services, rather than upon planned outcome. One of the most popular public library programs for children is the summer reading program. If it can be demonstrated that public library summer reading programs positively affect reading level retention, justification for at least continuance of these programs can be made.

Purpose and Objectives: The purpose of this study is to evaluate the effect of a summer reading program instituted in a national sample of public libraries. If the results of the project provide evidence that summer reading programs positively affect reading retention, the results can be used to gain financial support for the program. Furthermore, positive results would be useful for marketing summer reading programs. Negative results could be used by library management in determining objectives for summer reading programs (e.g., recreational, not educational) and in deciding among programs competing for funding.

Methodology: A national sample of public libraries, stratified on the basis of size, would offer a typical summer reading program, using the same publicity materials, program components, etc. In each library, one fourth-, one fifth-, and one sixth-grade class would be randomly selected to participate in the study. From each class, summer reading program participants would be randomly selected. At the end of the normal school year, each student in the randomly selected class would be given a standard reading level test (e.g., the reading level test from the California Achievement Test). At the beginning of the subsequent school year, after the summer reading program, the test would be readministered. Computation of class pretest-post-test gain scores could be made and a t-score could then be computed between experimental and control groups on the gain scores; or, analysis of covariance, with pretest scores as the covariable, could be computed.

Cost: This large-scale national study, designed to include approximately 260 public libraries, 980 upper primary grade classrooms and 20,000 students, could be done in 2.5 professional person-years. Additional expenses would be incurred for testing instruments and publicity and program materials. A less ambitious study limiting the subjects to one upper primary grade, e.g., fourth grade only, could be done with 1.75 professional person-years.

SUMMARY OF PROJECT 27: IDENTIFICATION OF RESEARCH METHODOLOGIES OF UTILITY IN LIBRARY AND INFORMATION SCIENCE

Background: Research methodologies and data-gathering techniques used in the field of library and information science can be characterized as:

(1) predominantly borrowed, often uncritically, from other fields;
(2) used non-cumulatively, i.e., in isolation;
(3) lacking in imaginative application;
(4) narrow in scope.

To improve the quality of research in the field, we need to identify a broad range of potentially useful methodologies that can then be systematically validated and tested for reliability.

Purpose and Objectives: The purpose of this project is to identify a broad range of research methods and techniques that have potential utility for the field of library and information science research. The immediate beneficiaries will be library and information science researchers. However, both practitioners and information systems users will undoubtedly benefit from methodologically improved research studies.

Methodology: The project will use the Delphi technique, with electronic mail, to obtain a reliable consensus from about 50 research experts in the natural, physical, and social sciences, humanities, and the professions, on the methodologies appropriate to the study of a set of research problems/questions in the field of library and information science. Each individual will be assigned to one of six groups--one for each of five general areas, and one multi-area group. All of them will be asked to propose appropriate methods and techniques to study a set of 15 research problems.

In the second stage, within-group proposed methodologies will be shared. A third-round questionnaire of within-group proposals will be undertaken in an attempt to reach some level of consensus. A fourth-round questionnaire will be developed that integrates proposed methodologies and techniques across all groups. To achieve consensus, a fifth round questionnaire might also be necessary.

The final product would be a monograph of basic research methods for library and information science.

Cost: Approximately 8 professional person-years.

SUMMARY OF PROJECT 28: PROGRAMS OF STUDY FOR LIBRARY AND INFORMATION SCIENCE RESEARCH PERSONNEL

Background: There are six key problems that make the teaching of research methodology in the field of library and information science difficult:

(1) students' limited knowledge of the concerns of the field
(2) students' limited background in research design, methods, and techniques
(3) students' limited motivation to study research methodology
(4) limited time for research methodology in the curriculum
(5) limited materials designed specifically for teaching research methodology related to library and information science
(6) limited number of faculty trained at a sufficiently sophisticated level to teach research methodology courses in the field

Purpose and Objectives: The purpose of this project is to develop a sequence of model courses in library and information science research design, methodology and application at a variety of levels. The immediate beneficiaries will be library/information science school curriculum planners and instructors of research methodology courses. Secondary beneficiaries will be students in research methodology courses, with subsequent benefits accruing in the ability to solve problems in information practice in a more systematic manner.

Methodology: This study is, in essence, a development project. A principal study team of library/information science educators would gather all identifiable research course syllabi and related materials from the field and compile an annotated bibliography of relevant monographs and journal articles. A supplemental bibliography of materials produced outside of library and information science would also be created. A secondary study team of research methodology educators from the field would meet in a two-day session with the principal study team to develop model courses. The principal study team would then draft a model-courses package that would be reviewed and critiqued by approximately 25 research methodology educators from a wide variety of disciplines and professions. In the final stage of the project, the principal study team will complete a monograph presenting the model course package and information about it. The monograph would be made available to all library and information science schools.

Cost: 2 professional person-years, with additional expenses for the two-day meeting of library/information science researchers.

SUMMARY OF PROJECT 30: DEVELOPMENT OF A NEW ECONOMIC THEORY

Background: The impact of information both as a resource and as a product has yet to be integrated adequately into the thinking of contemporary economists. Nevertheless, information, which is characterized by simultaneity of ownership, difficulty in exclusion, and non-depletability, is responsible for over 50% of our gross national product. Many feel that our current economic chaos may be related to the fact that economic systems and public policies are being based on assumptions that are no longer true. The market does not act the way that it once did and has become unpredictable, even to the most skillful forecasters.

Purpose and Objectives: The purpose of this project is to achieve a better understanding of the role of information in our economy and to devise an economic theory that is built on accurate assumptions and is therefore more useful as a planning and policy tool. The specific objectives are:

- to bring together creative thinkers from a variety of disciplines to consider the problem
- to develop hypotheses that can be tested
- to provide a synthesis and integration of ideas.

If successful, this project would benefit every person in the country.

Methodology: A group of bright, creative thinkers in a variety of disciplines will be asked to develop one or more hypotheses that can be evaluated and then the group will be brought together in a retreat environment for debate and discussion. Ten to fifteen economists will be asked to prepare papers, which will be discussed at the meeting. The agenda will include discussions of specific economic functions but will also provide ample opportunity for participants to break away from traditional ideas. Each participant will be encouraged to describe how he/she would construct a model to reflect the workings of our economy. After the meeting, several participants (synthesizers) would prepare papers. Original papers would be revised and all would be published.

Cost: The project will require approximately 1.5 person-years, plus travel, conference, and publication expenses.

SUMMARY OF PROJECT 33: ALTERNATIVE FUNDING POSSIBILITIES FOR PUBLICLY SUPPORTED LIBRARY AND INFORMATION SERVICES

Background: Public libraries are facing a financial crisis of massive proportions. Inflation, the fad of fiscal austerity at every level of government, and a burgeoning private information sector have eroded the financial base that has long supported traditional library services. Librarians have resisted the use of fees on the political and philosophical grounds that information should be freely available to citizens in a democratic society. Some libraries do, however, charge for some services such as the rental of best sellers and the searching of databases. While the presence of these activities does not appear to have affected public support for other library services, the information concerning the impact of such fees is really inadequate to form a sound conclusion.

Purpose and Objectives: This research into the past and potential impact of using fees seeks to help public libraries achieve financial stability. The objectives are:

- to collect and analyze data about current use of library fees
- to provide a mechanism to assist the library community to distinguish types of information and the principles affecting the accessibility of each
- to develop pricing models for selected library services.

Direct beneficiaries will be library administrators. Long-term beneficiaries will be public library users.

Methodology: There will be three phases. Phase I will consist of a survey of public library administrators, with selected follow-up interviews, to collect data on and use of fee systems. The data will be analyzed and an interim report prepared for use in Phase II.

In Phase II, approximately 50 public librarians, information scientists, and experts in municipal finance will meet to make distinctions among types of information and to arrive at agreement about which library services should be tax-supported and which might be supported by fees.

In Phase III, the final part of the research, models will be developed that provide practical information to library administrators about the use of fees. Information useful in the promotion of fee-based services will also be provided. Preparation of a Final Report, written in a lively, readable style, will complete the project work.

Cost: Phase I: 6 to 8 people for one year. Extra expenses for data processing and communications. Phase II: Travel and support expenses for 50 people for three days. Also requires conference planners and 1 or 2 people to prepare meeting report. Phase III: One librarian, one economist, and one marketing expert for six months. Total cost is estimated to be 3 person-years, plus data processing, communications, travel, conference, and publication expenses.

SUMMARY OF PROJECT 34: IMPACT OF NEW INFORMATION TECHNOLOGIES AND SERVICES ON PUBLIC LIBRARIES

Background: The advances in computer and communications technologies that occurred in the 1970s are now being applied to practically every facet of our lives. These developments are having a major impact on institutions charged with the collection, storage and distribution of information. Some public libraries are making great strides in using high technology to provide better services, while others are running as fast as they can just to deliver traditional services. At the same time, numerous projects are testing home information delivery systems that bypass the public library altogether.

Purpose and Objectives: The goal of this research is to assist public libraries to use emerging technologies in a creative manner to make new services available and to provide old services more efficiently and effectively. The specific objectives are:

- to develop a database on information technologies and services and their possible use by public libraries
- to make the database widely available
- to develop a mechanism for keeping the database current.

Library administrators facing decisions concerning the use of technology and the development of new services will be the prime beneficiaries of this research. Long-term beneficiaries will be library users.

Methodology: All available information concerning computer and communications technologies and their uses will be collected by means of a literature search and contact with government agencies, public libraries, and private organizations. The materials obtained will be indexed by:

(1) type of technology

(2) use

(3) name of project

(4) corporations involved

(5) geographic location

The information will be transformed into a database that will be made available in one or more ways, e.g., through the National Center for Educational Statistics, through state library agencies, or through a central independent source for a fee. Maintenance of the database will depend on the mechanism established for distribution.

Cost: The project will require 8 to 10 professional person-years over two years. Additional expenses will be incurred for equipment and data processing.

SUMMARY OF PROJECT 35: DEVELOPMENT OF EXPANDED COMMUNITY LIBRARY AND INFORMATION CENTERS THROUGH USE OF NEW TECHNOLOGIES AND INSTITUTIONAL RELATIONSHIPS

Background: The major forces shaping public libraries today are: expanding technologies, a shaky economy, and the proliferation of public and private sources of information. While these forces have pushed libraries into networking, hastened the development of automated systems, and generated questions about the future role of the public library, they have also brought about reduced budgets and the closing of many libraries. The basic premise of this research project is that to intervene in a financial cycle that threatens to put many libraries out of business and rob citizens of access to information requires an integrated approach.

Purpose and Objectives: The overall goal of this project is to help public libraries redefine their role, provide expanded services, and re-attract the local support that has historically provided the bulk of library funding. The primary objective of the project is to create three to five integrated community information utilities ("libraries of the future") that will serve as models for decision makers and demonstrate that sophisticated library and information services at the community level are possible. The primary beneficiaries will be citizens residing in the model communities. Other beneficiaries include public libraries and other community agencies throughout the country.

Methodology: Three phases will be undertaken over four years. Phase I: Research and Development (12 months). A database on the use of information technologies will be developed at the same time that an operational plan is being developed, potential participating libraries are being contacted, and funding for the implementation phase is being sought.

Phase II: Implementation. This phase will be coordinated by a central office, whose staff will provide training and technical assistance to the participating communities. Local advisory committees will ensure that the real information needs of the community are addressed and will help to obtain support for the project. The information delivery systems implemented in each community will be locally run, the emphasis being on using technology creatively to meet the information needs of each particular community.

Phase III: Evaluation. The final evaluation will describe each project, evaluate its success in meeting the needs of the specific community, and compare the various approaches taken.

Cost: Approximately $8 to 10 million. Since one aspect of the project is to achieve public/private cooperation in this area, financial support for the project should come from government agencies, foundations, and corporations.

SUMMARY OF PROJECT 38: EXPLICATE THE CONCEPT OF COOPERATIVE COLLECTION DEVELOPMENT IN LIBRARY NETWORKS

Background: Although cooperative collection development is often discussed and a few schemes have been implemented for serials, the concept has not been developed and articulated sufficiently. Most discussions cen- ter on the techniques or mechanics for doing cooperative collection develop- ment: how do we do it? The first question that should be considered is: what is cooperative collection development? Little, if any, work is in progress to define and explicate the concept.

Purpose and Objectives: The primary purpose of this research project is to define and develop the concept of cooperative serials and book collection development in library networks. This would include explicating the concept; establishing goals and objectives of cooperative collection development; identifying and reviewing alternative ways of implementing the concept; and speculating on the expected benefits. The following questions should be considered:

(1) What is cooperative collection development?

(2) What kind of access is required for different kinds of "materials?"

(3) What would be the impact on library acquisitions and storage?

(4) What are the costs and benefits for users?

(5) How can cooperative collection development programs be evaluated?

(6) What are the critical factors for effective cooperative collection development?

(7) How would widespread applications affect publishers of library materials?

Methodology: The proposed project is primarily a desk study that calls for clear, organized, original thinking and research writing. It should begin with a quick review of current literature and possibly telephone conversations with selected individuals involved in cooperative collection development programs. Another early task is the definition of the problem. Once the problem has been adequately described, cooperative collection development can be defined and alternative strategies to accomplish it considered.

Cost: 1 professional person-year.

SUMMARY OF PROJECT 39: EVALUATION AND IMPACT OF THE PUBLIC LIBRARY ASSOCIATION'S PLANNING PROCESS

Background: In 1980, the Public Library Association (PLA) departed from its tradition of publishing public library standards and introduced a planning process for use by public libraries to assess their community needs; evaluate current library services; determine the future role of the library in the community; set goals, objectives, and priorities; develop and evaluate alternative programs, services, policies, and systems; and monitor progress toward the accomplishment of goals and objectives. The planning process was designed to produce a written long-range plan that would be continually up- dated. The PLA is promoting the planning process heavily, and it is being applied by many public libraries across the country. Its use, however, has raised a number of questions.

Purpose and Objectives: The purpose of the proposed study is to conduct a thorough evaluation of the planning process and its applications in order to assess its impact on public library services and programs, staff attitudes and morale, management changes, funding, and community awareness. The re- search project would identify the goals and objectives of the planning pro- cess and determine if they are being met.

Methodology: The project will be carried out in two phases. Phase I will be a survey of all libraries that have completed at least one cycle of the planning process. It will consist of the following tasks:

(1) Develop frame of libraries completing at least one cycle of planning process.

(2) Develop questionnaire for use by mail.

(3) Develop analysis plan.

(4) Test and modify questionnaire and analysis plan.

(5) Conduct survey.

(6) Collect and analyze results.

(7) Prepare draft report on findings.

Phase II will be a detailed onsite investigation of 20 libraries selected from the reporting libraries in Phase I: ten libraries that have had favorable results with the planning process and ten with no results or unfavorable results. The purpose of the case studies is to determine "why" the results turned out as they did, e.g., what factors contributed to success or failure? The product of Phase II will be a report describing the success and failure factors, with recommendations on future applications of the planning process.

Cost: 1-1/2 professional person-years over 12 months, with an additional $10,000 to cover telephone, travel, printing, and computer expenses.

SUMMARY OF PROJECT 40: RESEARCH ON THE IMPACT OF PUBLIC LIBRARY USE

Background: Recent literature in the information fields herald the growth and importance of information; yet little is known about the impact of its use. Research on the impact of information could involve a series of studies designed around different kinds of information and users. The proposed project takes the perspective of public library users. What is the impact of using library materials on public library users and how do library serivces help users?

Purpose and Objectives: The purpose of the project is to describe systematically the ways that the use of library materials impacts people. A conceptual model is to be developed, tested, and modified. It should provide a means to answer questions such as the following:

- How do library clients perceive that the use of library materials has helped them?
- How does reading function for different people?
- Which forms of library use have the greatest impacts?
- How do library users evaluate the impact of using library materials?
- How could libraries design services to have greater impact on users?

Methodology: The first task will be the development of a conceptual model of the ways in which library use impacts users. The model, which will concentrate on the use of library materials, will be tested in one community. The purpose of the study is not to enumerate the impacts but to attempt to understand how the impacts occur. Based on the test application, the model will be modified as necessary. A report will be prepared describing the model, results from the tests, and implications for further research and applications.

Cost: 3 professional person-years.

SUMMARY OF PROJECT 41: THE ROLE OF ELECTRONIC HOME DELIVERY SYSTEMS IN MEETING INFORMATION NEEDS OF CITIZENS

Background: A number of new electronic systems are currently being tested for delivery of information into the home. These systems include "teletext," "viewdata," and home computer terminals linked to numerous databases, e.g., The Source. Technology is driving the early design of these new systems; there appears to be little user input at this stage. On the basis of what is known about the average citizen's perception of infor- mation (most people don't approach problem-solving in terms of obtaining better information), the role of electronic home delivery systems in helping citizens satisfy their information needs presents a new area for research.

Purpose and Objectives: The purpose of the project is to study the role of electronic home delivery systems in meeting information needs of citizens. Research questions include:

- What are the perceptions of the usefulness of such systems for meeting information needs?
- What are the characteristics of the people most likely to use these systems?
- How will these systems compare with other information sources?
- What kinds of situations will lead to use of these systems for problem-solving?

A secondary objective of the study is to speculate on the role of the public library in light of the in-home information delivery systems.

Methodology: The proposed methodology is a survey of citizens in a single community. A valid statistical sample should be used for personal interviews of citizens. The project tasks are:

(1) Conceptualize the problem.

(2) Define issues and questions.

(3) Define analysis plan.

(4) Design questionnaire for personal interviews.

(5) Test questionnaire and analysis plan.

(6) Conduct survey.

(7) Process and analyze results.

(8) Report findings.

Cost: 3 professional person-years.

SUMMARY OF PROJECT 43: PROMOTING IMPROVED FUTURES FOR LIBRARIES (STUDY I)

Background: This study addresses a number of problem areas related to planning for the most desirable future for libraries. First, librarians tend to be reactive rather than proactive. Second, library professionals frequently fail to view the library as a dynamic institution within a societal context. Third, many librarians seem unaware of the effect that they can have on moving the library toward a most desirable future.

Purpose and Objectives: The major purpose of this study is essentially the same as that of the futurist--not to predict but to generate images or perceptions and to analyze them so as to increase the probability of producing futures more to our liking. A second purpose is to assist library professionals in systematically exploring new and expanded visions of librarianship and developing innovative solutions to problems. It is hoped that, by participating in this study and having access to the findings, library professionals will develop a framework for planning, through the investigation of what futures are possible for libraries, which are probable, which are most desirable, and what issues must be addressed by the library profession to achieve the future it has chosen. The beneficiaries of this study will be library professionals who want to become an effective and positive force in planning for the future of libraries.

Methodology: Scenario writing has been selected as the method of presenting various constructs of the future for the exploration of librarians. An advisory committee composed of leaders in the library profession, the principal investigator, and a futures research consultant will develop four internally consistent scenarios describing alternative views of the United States between 1981-2001, with attention being given to trends and events relevant to libraries. This group will then assess the degree of probability of each scenario, determine the major implications for libraries to be found in the scenarios, the common developments in all four scenarios, characteristics of each scenario, major potential discontinuities and contingencies that form the bases for alternative scenarios, etc. Finally, the group will identify the major issues related to libraries to be addressed within the selected alternative future. The study will not be limited to any one type of library.

Cost: The study would require a principal investigator and a futures research consultant for 1-1/2 years, plus funds for database searches and at least two meetings with library leaders.

SUMMARY OF PROJECT 44: PROMOTING IMPROVED FUTURES FOR LIBRARIES (STUDY II)

Background: This study addresses the same problem areas identified in Project #43 (Study I) on Promoting Improved Futures for Libraries, which focuses on helping librarians plan for the most desirable future in libraries. The second study builds upon the results of Study I, where four scenarios were developed to investigate the possible course of libraries in these alternative futures, an alternative future was selected as a basis for planning, and major issues related to libraries within that future were identified.

Purpose and Objectives: The major purpose of this study is to help library professionals begin to formulate solutions to problems/issues that must be overcome in order to move toward implementation of the alternative future selected in the first study on this topic. A second purpose is to involve librarians in a group communication process that will encourage them to broaden their thinking about their roles and responsibilities in promoting alternative library futures. The specific objectives of this study are:

(1) to identify the range of possible solutions to the problems/issues identified in Study I

(2) to assess the current thinking, the perceptions, values, and biases of librarians who are in a position to have an impact on the future direction of library development

The beneficiaries of this study will be library professionals, who, as planners and decision makers, have a large part in determining the future development of libraries.

Methodology: Using the Delphi technique, this study will attempt to achieve consensus among a panel of library leaders about feasible, desirable solutions to issues/problems relating to the alternative future selected in Study I. As was the case in the first study, the present study has not been limited to any one type of library or information services institution.

Cost: .67 professional person-years over one year, plus additional funds for a futures research consultant.

SUMMARY OF PROJECT 45: THE SCHOOL LIBRARY MEDIA SPECIALIST'S IMPACT ON CLASSROOM INSTRUCTION

Background: The major problem area that this study addresses is the difficulty of assessing the impact of media services on the educational program in elementary and secondary schools. For years, media professionals have attempted, with little success, to show a direct relationship between pupil academic achievement and the services of the school media specialist. One of the major reasons for this problem is because pupils generally are indirect recipients of these services in the instructional area, so it is extremely difficult to isolate the impact of the school media specialist on their academic achievement. Instead, attention should be focused on the influence of the media specialist in helping teachers to teach more effectively, since it appears that teachers who receive services related to instruction from the media staff can significantly improve their ability to help students learn more effectively.

Purpose and Objectives: The purpose of this study is to assess the media specialist's role in promoting more effective teaching in the classroom. The objectives are to investigate the role of the media specialist in the planning, implementation, and evaluation of instruction; to examine the media specialist's impact on the classroom environment; to determine the extent to which increased individualization of instruction occurs in the classroom; to investigate the extent to which teachers involved in the study become more effective presentors of instructional activities; and, to determine if inclusion of the media specialist in the instructional process will make a significant difference in student self-concept. The direct beneficiaries of this research will be school media professionals who wish to have objective information that demonstrates the impact of media services on the teaching process. In addition, if the results of the study show significant differences, teachers who desire to find more effective methods to improve their teaching will also be beneficiaries.

Methodology: An experimental methodology will be used. A media specialist will be assigned to work with a certain number of teachers on a full-time basis, to help them plan, implement, and evaluate learning alternatives for their classes. Another teacher will be assigned to work with a comparable number of teachers on a full-time basis. A third set of teachers will act as the control group. At the end of the treatment period, a number of items will be measured and compared to identify significant differences. Several major design elements must be taken into consideration and controlled in order to be able to attribute differences in the groups to the intervention that took place. A quasi-experimental method will be used, if necessary, to overcome many of the problems inherent in doing a study in an environment where complete experimental control is very difficult, if not impossible, to achieve. This approach is applicable to the investigation of the instructional role of the school media staff and would have limited use for librarians in other settings.

Cost: 2 professional person-years plus funds for employing a media specialist and a resource teacher and for providing extra supplies for these people and teachers in the control group.

SUMMARY OF PROJECT 46: SCHOOL LIBRARY MEDIA PROGRAMS AND NETWORKING

Background: This study addresses itself to the level and types of involvement of school media programs in library networks. Networking has received increased attention in the school library media area, as schools have moved toward personalizing instruction for students. In fact, the one long-range recommendation of the NCLIS task force on the Role of the School Media Program in Networking was that library networks in which school library media programs are full participating members be established and operational in every region, state and area of the nation. How far school media professionals have progressed toward this objective has not been established. Further, whether school media programs receive equal treatment in and provide equal contributions to library networks is also largely undetermined.

Purpose and Objectives: The major objective of this study is to determine the present status of school library media programs in library networks. The target population will be school media professionals who are attempting to establish guidelines and future directions for more effective participation in library networks to meet the needs of teachers and students.

Methodology: The survey method will be used to gather the information needed to answer the research questions. The latest editions of the ASLA Report of Interlibrary Cooperation and Library Networks will serve as major sources for information about existing cooperatives and networks and their services. Further, key personnel charged with directing network activities of library networks in which school media programs are participating will be surveyed to obtain relevant information related to level and type of participation. A stratified random sample of school media supervisors from school districts that are participating in networks will also be queried to provide complementary information about school media participation.

With modifications, this approach can be used to investigate the status of other types of libraries in library networks.

Cost: 1 professional person-year, plus funds for purchasing tapes from the National Center on Education Statistics.

SUMMARY OF PROJECT 48: STUDY OF LIBRARY SCHOOL GRADUATES

Background: Little information is available on the reasons why individuals elect to go to library schools, what they think of their library education, and what they do after leaving school.

Purpose and Objectives: There is some reason to believe that fundamental problems exist with the information profession, but there is little evidence on which to base an analysis. For example, how many graduates of library schools actually enter the information labor force, and what are the reasons that they do or do not? Are the technological advances in the information professions reflected in the training of those professionals?

Other major questions relate to the career patterns of information workers. How long do they stay at a particular job? How do their salaries change over time? Is their pay scale comparable to others that are doing similar work? What are their unemployment patterns?

Perhaps the most perplexing problem has to do with the nature and degree of occupational transfer and the reasons that can be attributed to its occurrence. It would be very useful to understand what it is about librarianship that causes people to leave the profession after some period of time. This information could lead to a rethinking of the structure and nature of information professional jobs.

Methodology: The methodology would involve selecting a stratified random sample of individuals and following their careers for approximately 10 to 15 years. A longitudinal approach could be avoided if there was reason to believe that perceptions and facts from the past could be reconstructed accurately. If not, repeated interviewing of the same individuals over time would be required.

Cost: 5 to 6 professional person-years plus appropriate clerical support.

SUMMARY OF PROJECT 49: RESTRUCTURING THE NATIONAL INCOME ACCOUNTS

Background: There is constant discussion in the United States today about the view that ours is becoming an information economy. The basis for this claim lies in the work of Machlup and Porat, who have analyzed in detail the amount of money spent on various information activities. The National Income Accounts of the United States record the monies spent by various sectors of the economy. The accounts are so organized that it is not possible to determine directly the size of the information sector. It would be desirable to determine the feasibility of providing details on the size of the information economy on an ongoing basis by evaluating current methods for measuring the size and arriving at new methods, if appropriate.

Purpose and Objectives: The purpose of the research would be to analyze in detail the two different approaches taken by Machlup and Porat and decide which one is the best. The second part of the study would develop alternative approaches to both Machlup's and Porat's approaches and choose the best among these. The project could then consider the feasibility of implementing a single approach to be applied to a long-term study that would measure the economic and structural changes in the information sector.

Methodology: Little experimental or survey data would be needed for such a study. Rather, a detailed analysis of the work of Machlup and Porat would be necessary. Familiarity with National Income Accounting and the Federal agency performing it would be an asset.

Cost: 1.25 professional person-years.

SUMMARY OF PROJECT 50: MEASURING THE PRODUCTIVITY OF INFORMATION WORKERS

Background: Traditional performance measures of libraries and other information organizations take into account the quantity and, to some extent, quality of the services provided, but few studies have delved deeply into the matter of worker productivity within the information professions.

Purpose and Objectives: For a number of reasons, we should be developing measures of productivity for information workers. This includes monitoring individual performance to determine how productivity is affected by the introduction of automation and to analyze the trends in productivity in various types and sizes of libraries.

Methodology: The problems involved in developing measures of productivity are numerous. First, it is necessary to determine how to measure the output from an organization. In the case of a manufacturing organization, it is relatively straightforward to determine output and, in fact, most productivity analysis has been conducted for these types of units. But service organizations generate a much more varied set of outputs, which are thus much harder to measure. Included in a productivity measure are usually variables that are surrogates for the quality of the service pro- vided. A major problem in the research will be to develop the measures of quality.

The project would first examine productivity measures in other sectors of the economy. The next phase would involve developing measures of output that include quality variables. Empirical testing of the measures against a sample of information organizations would be necessary to ensure their validity.

Cost: 2 professional person-years.

SUMMARY OF PROJECT 51: PROPERTY TAX AS AN EQUITABLE MEANS FOR FUNDING PUBLIC LIBRARIES

Background: A large proportion of the funds for the support of public libraries comes from local property taxes. Public library users have been characterized by a number of studies with regard to age, sex, income, occupation, and the like. An important area that has yet to be investigated, however, is the relationship between the users of a library and the suppliers of funds for that library, particularly in instances where property taxes are the library's primary means of support. The problem of equitably distributing the funding burden could be potentially complicated if direct charges were instituted, as some libraries now propose to do. Potentially, one set of users would pay direct charges, while another set would support the library through property taxes. Conversely, the same group might be put in the position of paying for library services twice--once for direct service and again through property taxes.

Purpose and Objectives: The purpose of this is to develop data bearing on the question of whether property tax is an equitable means for funding public library service.

This project could also investigate how the burden of support through the property tax varies when a cross section of taxpayers is examined against a longitudinal study of taxpayers. There is some evidence that a longitudinal analysis of property tax burden produces different distributional results. Another aspect of this project might compare alternative funding methods for libraries and examine their effectiveness in equitably distributing the funding burden to the public.

Methodology: The project would require a detailed synthesis of the library user study and library finance literature. A model describing the incidence of property tax would have to be developed and validated with empirical data from available user studies and property tax information. Lacking available secondary data, it might be necessary to conduct surveys to get both use and property-tax data for the same time period.

Cost: 2 professional person-years.

SUMMARY OF PROJECT 52: USER COMMANDS AND DIALOGUE PROTOCOLS IN ONLINE BIBLIOGRAPHIC SYSTEMS FOR THE PUBLIC TO USE IN HOMES, INFORMATION CENTERS, AND LIBRARIES

Background: The Z39-G Subcommittee of ANSI and the ISO TC46-SC4-WG5 have been struggling with the idea of preparing a standard command language for bibliographic retrieval systems. Their work will only scratch the surface of the problems caused by the proliferation of retrieval system features and languages for commands, and they do not address the protocol (or order of statements in the interaction) nor the system responses. They are also assuming that the intermediary and the end user have common attributes, which may or may not be a correct assumption. Someone or some group should begin to get a handle on this Tower of Babel and see if some simple standards of clarity, consistency (in structure syntax, and use), flexibility, power (optimization of recall and precision), simplicity, and protective and forgiving capability can be developed and incorporated into the public online services. Such an effort would benefit all public users of online systems without detracting from the individuality and strengths of existing systems or databases.

Purpose and Objectives: This research would give us an illustrated catalog of system functions and the beginning of an assessment of system characteristics. The results would serve as a talking point for some agreement on basic common features across systems and would effectively begin to implement some industry-wide standards. Such research and interaction between system designers could ultimately benefit all users of online systems and bridge the gap between systems for the home market and the more traditional information industry of libraries and information services.

Methodology:

(1) Expand the survey of public access online catalog features (currently in progress by Charles Hildreth at OCLC), to include (by updating) retrieval systems' studies (by Martin, NFAIS, Conger) and distribute to a knowledgeable audience such an illustrated compendium of system features.

(2) Arrive at a consensus of basic common features. Exemplify what protocols are possible with such commands and what system responses could look like.

(3) Call an invitational conference where the features and protocols are reviewed, some consensus is reached, and minimum standards (e.g., for clarity) are arrived at.

Cost: 1 professional person-year, with support for compilation, computer use, graphic presentation, travel and subsistence for approximately 25 conference participants, and reporting the findings and recommendations.

SUMMARY OF PROJECT 53: DISPLAY FORMATS AND OUTPUT CONSIDERATIONS FOR ONLINE PUBLIC ACCESS CATALOGS IN DIVERSE SETTINGS

Background: The online interactive information retrieval system environment permits access to this type of service, with or without the use of an intermediary, i.e., a librarian or information professional. The generation of private databases and individualized software on microprocessors could help to proliferate what is already a very heterogenous assembly of information services. What the user sees and may want to see may be two very different things. Can we arrive at some guidelines for what to output and what not to output, and for how much a screen should display for comprehension or for output? Shneiderman's recent work at L.C. and elsewhere (the philosophic essence is in his Software Psychology) is of profound interest here and could lead to a new awareness of correct and essential efforts at improvements.

Methodology:

(1) Develop, for various systems, a User Panel that represents the spectrum from naive/beginner to experienced/seasoned.

(2) By using the findings from Project 57, conduct trials of preference for various displays and outputs.

(3) Compare these findings with the Review Panel mentioned in Project 57. Be sure that the User Panel represents the usual demographic characteristics of the average family, the typical public library user, the academic community, etc.

(4) Allow the Principal Investigator the opportunity to display alternatives to these displays that will be useful on CRTs, TV screens, and hardcopy printers. Also allow him to list output considerations.

(5) Arrive at an answer (graphically) to the following question: What will replace the 3x5 card for bibliographic entries?

Cost: At least 1 person-year for the Principal Investigator, with travel expenses to study existing systems on site, conduct focused interviews, and develop findings from the User Panel.

SUMMARY OF PROJECT 56: IMPROVED INDEXING CAPABILITIES ONLINE

Background: We have come a long way from the early constraints of direct matches in controlled vocabulary fields to today's "free text" searching in almost every field of the record in online bibliographic files, including online library catalogs. But we have, for the most part, still kept the online searcher in the dark about the syndetic relationships between descriptors, and we have provided little assistance if a search is made in free text. Given this state of affairs, several possibilities present themselves for automatic user-searcher assistance. These possibilities need to be assessed to find out if they really will improve the construction and maintenance of thesauri and the indexing and searching of databases.

Purpose and Objectives: This research would survey and evaluate the existing systems for linkages between online subject authority files, basic indexes to "free text" in online databases, and machine-readable dictionaries and technical glossaries for various subject fields. This work would benefit online system designers and users.

Methodology:

(1) Investigate the availability of online thesauri, subject authority files, machine-readable glossaries, and dictionaries. Match up with databases on several systems and library catalogs online.

(2) Itemize, describe, and illustrate the existing tactical aids and tools for the online searcher.

(3) Develop a prototype system to demonstrate Bates' search tactics and other potentially useful aids discovered by the research team.

(4) Run controlled tests to determine retrieval scores and user satisfaction with these search aids and subject indexing capabilities. Whenever possible, run tests on operational as well as experimental systems.

(5) If feasible, load and use glossaries and dictionaries online, performing controlled tests with and without this feature.

(6) Assess the practicability of a common online subject authority file or switching system across databases and a common set of tactical aids for the online searcher.

Cost: Staff for this project would include a principal investigator (2 to 3 person-years), research assistants (4 to 5 person-years), and consultants (2 person-years). Also needed are students (4 to 5 person-years). Other expenses would be for computer time, database development, payment for machine-readable files, and travel for at least 3 months (to contact system and database suppliers in their own environments.)

SUMMARY OF PROJECT 57: DESCRIPTION OF INFORMATION ITEMS FOR IMPROVED ACCESS ONLINE

Background: After 80 years of professional efforts to establish codes of description, most library card catalogs are gradually starting to look alike in format and content, and, after more than ten years of online databases, the abstracting and indexing services are accepting a "vendor standard," so that the user on one vendor's system does see some uniformity across data elements in the various databases. However, notwithstanding AACR2, COSATI Cataloging Standards, NFAIS and Z39 efforts, the description (naming and format) of information items in online catalogs and bibliographic databases shows no signs of verging toward commonality.

Purpose and Objectives: This research would develop a typology of common data elements in online bibliographic records, with guidelines for abbreviated tags and order of data elements in both brief and full-record displays. This research would benefit all online information users and would aid vendors who must presently accommodate the present variation.

Methodology: The work of others who have grappled with this problem would be reviewed. The current status of displays in several "public" systems (i.e., commercial vendors, utilities, networks, and academic and public online library catalogs) will be surveyed and illustrated. A compendium of data elements, tag (field) names, and abbreviations would be assembled. A set of model brief and full displays would be prepared. A review panel consisting of members of the user and producer communities would select the most acceptable ones. Data elements not now in some files would be suggested for inclusion, and data elements for identifying records in numeric databases might be explored.

Cost: Project staff would include a principal investigator (0.5 person-year) and support personnel (1 person-year). Additional expenses would be incurred for computer time, communication, and report preparation.

SUMMARY OF PROJECT 59: COGNITIVE, AFFECTIVE, AND SENSORY DIFFERENCES AMONG MEDIA AS EXPERIENCED BY INFORMATION SEEKERS

Background: Research has been done for many years on the channels of information used by study populations. However, little, if any, research has been done on the cognitive and sensory differences experienced by the viewer/listener/reader of various media, especially the differential impact of the various media on the person's experience of the information received through those media. Differences among media and their impact, e.g., on the ease of comprehension, may determine, at least partially, the choice of medium by information seekers. Research done in various fields touches the edges of this question, but none gets at the central comparison of media effects.

Purpose and Objectives: The purpose of this project is to develop a research paradigm for studying the effects of media upon information transfer--to identify the variables and their values, and to propose a series of subsequent studies to test this paradigm. This design study should contribute ultimately (after the later empirical studies are done) to our scientific understanding of human responses to media and should provide results of practical value for decision-makers in both communications and library/information science. If we learn, for example, of preferences for obtaining some types of information through certain media, decisions can be made about which "carrier" to purchase in a library.

Methodology: The project will delineate and describe the variables to be considered in studies of this area and outline several studies of likely interest. The variables can be grouped into several classes:

- type of medium, e.g., aural, aural-visual, tactile
- factors influencing medium choice, e.g., subjective sense of ease of use of the medium, whether the information is personalized to the individual or generalized to a group of users
- presentation of information, e.g., print (visual written language), diagrammatic (visual symbolic language), pictorial (visual non-linguistic)
- subject of information

Proposed studies will be a subset of possible combinations to produce the maximum amount of usable information from the fewest possible studies.

Cost: Project staff would include a principal investigator (0.3 person-year) and a research assistant (0.25 person-year). Online search costs are estimated to be $1,000.

SUMMARY OF PROJECT 60: COMPARATIVE EVALUATION OF SEARCH STRATEGIES

Background: A search strategy is an approach to or plan for a whole search. It is used to inform or determine specific search formulation decisions and operates at a level above term choice and command use. Literature proposing search strategies is almost non-existent. Literature on testing and comparing search strategies in manual and online environments is also apparently non-existent: not a single study was found that made a careful comparative test of search strategies.

Purpose and Objectives: Two substudies are proposed:

(1) It would be worthwhile to support work to identify possible strategies at the broader searching level, i.e., for the whole search, including choice of sources and between online and manual sources. In addition, new strategies might be found for online searching within a chosen database. This first study would yield a store of possible information search strategies to test empirically.

(2) The objective of the second study is to do comparative testing of previously identified strategies and of the other strategies developed in the first study, to discover which strategies are efficient and effective in which situations.

The beneficiaries would be professional information searchers of all kinds. Once good strategies are identified, there should be additional benefits for the teaching of students and the general public.

Methodology: For the second study, real questions should be used to test the strategies, with the questioners available later to give relevance judgements. Major types of questions and, possibly, subject areas, will be identified, and questions from each type will be tested. Most searches will be done by library and information science students. There should be sampling of questions, students, and strategies. The results of strategy use will be evaluated on three criteria--efficiency, effectiveness and the subjective reactions of the searchers. The results may give us clues for other research on information related behavior, as well as general problem-solving.

Cost: Study 1 will employ a principal investigator (0.3 person-year) and a research assistant (0.35 person-year). Online search costs for the study will be approximately $1,000.

Study 2 will employ 3 professionals (2 person-years), 2 research assistants (0.6 person-year), 40 to 60 students (800 to 1200 person-hours), and 40 to 80 requesters. Additional expenses for online searching will be approximately $40,000.

SUMMARY OF PROJECT 61: DISCOVERY OF MEANS TO OPTIMIZE BROWSING AS AN INFORMATION-SEEKING METHOD

Background: At least since Menzel's paper on "Planned and Unplanned Scientific Communication," we have been aware in information science of the importance of browsing as a means of encountering unknown or unsought useful information. Efforts are made to include browsing capabilities in automated information systems of various sorts, but this method of information seeking is little understood or studied. Perhaps browsing has been ignored because it tends to be casual, unplanned, and easily influenced by random factors. But, for the sake of those designing expensive browsing capabilities in automated information systems, and for the sake of scientific understanding of this form of information-seeking behavior, we should learn more about browsing.

Purpose and Objectives: The proposed study has two phases: (1) an extensive search of the literature in fields outside of library/information science, and (2) carrying out Licklider's idea on the comparison of "browseries." The purpose of this study is to compare the functions and effectiveness of three configurations of browsery in providing information to researchers in scientific laboratories, think tanks, or institutes. If the study produces a greater understanding of what contributes to productive browsing, then users in all types of information facilities may ultimately benefit.

Methodology: Phase 1 will involve a standard literature search and a write-up of relevant data found. In Phase 2, three types of browseries will be tested, along with two controls. The three configurations will be: materials central to a person's interests; material peripheral to a person's interests; and materials entirely novel to a person's interests. The controls will be: materials selected randomly from the source library from which the browseries are created, and no browsery.

The five conditions will be tested on groups of researchers in industrial scientific laboratories, think tanks, or academic institutes. In each institution, a browsery, consisting of materials selected from the library serving that institution, will be set up convenient to the target group's work locations. The browsery configuration will be changed every six months. Researchers will be told that we are experimenting with "small laboratory libraries of various types" but not about the specific character of each browsery. Each will be interviewed briefly four times during each six-month period about their use of the browsery, whether they encountered any new ideas or information and, if so, of what sort.

Cost: The study will employ 3 professionals (5.3 person-years) and 2 research assistants (2.4 person-years). Online search costs are estimated to be $1,500.

SUMMARY OF PROJECT 62: THE USER'S UNDERSTANDING OF THE LIBRARY AS A REFERENCE RESOURCE

Background: The first step in both studying and carrying out the task of promoting/educating public use of systems is to gain a better understanding of how people currently view and relate to those information systems. In particular, if we succeed in constructing in detail the image of the library as it is seen in the public's mind, that picture may provide clues to explain the low use levels that show up in study after study. Ignorance (i.e., inadequate image) may be a cause of low use. The literature suggests pieces of the public understanding of libraries, but it appears that at no time has there been an effort to build a picture of the public's affective and cognitive image of the library directly.

Purpose and Objectives: A series of studies would be required to build a reasonably complete model of the public's library image. The proposed study will concentrate on just one part of the cognitive image: the user's understanding of what types of reference resources are available, how to get to them, how to use them, and how the librarian is prepared to help them with reference questions. For generations, library school professors have told their students that library patrons generally do not ask for what they really want when they come to the reference desk. If people do not ask questions in a way that fits the librarian's conception of the library, the patron's image is probably different in essential respects. If we know what those differences are, we will be in a better position both to promote the library and to help users. An additional side benefit may be that we can educate some librarians to stop viewing users as being deliberately difficult when they ask questions this way.

Methodology: It is hypothesized that users' ignorance about reference sources leads them to make assumptions that, in turn, condition the way they phrase questions. The study will be conducted in an academic library settings, in different institutions. The study plan is, first, to find 20 to 30 students and faculty willing to participate in in a two-hour experiment. They will be interviewed, with minimal prompts to express their image. If they run out of things to say, they may be given two or three hypothetical information need situations and asked to solve those needs in the library in their normal manner, while telling the researcher what they are thinking. With this information, the investigators will construct a brief questionnaire/interview guide to be given to 200 or so patrons who come to the reference desk. The instrument will probe their assumptions about and expectations of the library resources and the librarian. The results of these two approaches may at last answer the question: Why do people not ask for what they really want at a reference desk?

Cost: The study will employ 2 professionals (1.2 person-years) and a research assistant (0.3 person-year). Online search costs will be approximately $500.

SUMMARY OF PROJECT 63: HIERARCHICAL STRUCTURING OF AN ONLINE SUBJECT CATALOG

Background: Virtually all public, school, and academic libraries use alphabetically-arranged subject catalogs. Yet, when catalog users are given the opportunity, they express an expectation of, or desire for, some form of hierarchical structuring when they do subject searching. If a lifetime of exposure to alphabetico-specific catalogs still does not stamp out a desire for hierarchy in subject searching, there is probably something very. useful and meaningful to people about this hierarchical structuring. If we design an online subject catalog for use by the general public in which the subject headings are arranged in menu-searching format, the user would not need to understand the subject heading system in order to search it effectively. An hierarchical structure would make users aware of subject term options that do not occur to them now and would enable them to select search terms better, with a sense of each term in relation to surrounding terms.

Purpose and Objectives: The purpose of this project is to develop and test in an operational environment an online subject catalog in which the terms are arranged hierarchically, and can be searched in a menu format, e.g., starting with the broadest terms. The study will have two phases. Phase 1: Determine the feasibility of converting the Library of Congress Subject Heading list into hierarchies and develop hierarchies for one test subject discipline. The results of this phase will help to determine the ultimate costs of such a hierarchy-based catalog. Phase 2: Develop a menu-driven subject catalog for the selected subject field and test it in an operational environment, comparing it, if possible, to another online subject catalog designed along different lines, to see if this sort of catalog is cost-effective and well-liked by users. The beneficiaries of this study may ultimately be all users of LC-based subject catalogs, which are found in most academic and large public libraries.

Methodology: For Phase 1, a subject discipline should be selected that matches the field of concentration of a university branch library that is to be the test library. Relevant terms in the LC list will be identified that are relevant to the chosen subject and hierarchies developed through use of the cross-reference structure in the list. Difficulties are to be identified and the likely cost of converting the whole list estimated. For Phase 2, the Development of a menu-driven online subject catalog should be done in conjunction with one of the existing online catalog systems, to save development costs. The catalog will then be implemented in the target library and user reactions assessed. Users should be observed directly (with their cooperation) and given interviews or questionnaires.

Cost: Would depend on whether existing systems would be interested and, if so, how much of their software could be used. Phase 1 will require 2 professional person-years plus support staff. Phase 2 will be at least a two-year project.

SUMMARY OF PROJECT 65: FIELD TESTING OF PROPOSED REVISION OF ANSI STANDARD FOR LIBRARY STATISTICS

Background: The current standard for the reporting of library statistics was adopted in 1969 by the American National Standards Institute (ANSI) Z39 Committee, Library and information Sciences and Related Publishing Practices. Since then, there have been a number of analyses and research studies that have pointed out the inadequacies of these standards and suggested different approaches. In 1977, the Z39 Committee established Subcommittee 7 on Library Statistics to revise the standard. The new standard is now close to a final draft that can be submitted for a formal vote by the member organizations of ANSI Z39. To date, however, field testing has been only on a voluntary basis and not carefully controlled.

Purpose and Objectives: Will the proposed standard provide aggregate reliable data for all types of libraries in a form useful for the federal government and for researchers? Is the information requested practical to collect? The proposed research is a field test or feasibility study for the collection of statistical data, according to the reporting categories specified in the new standard.

The beneficiaries of this research are the federal legislators who must make decision on library legislation, researchers who need accurate data, and library managers of all levels who require information on their operation for decision-making purposes.

Methodology: A single medium-sized state (e.g., Minnesota) should be used for the test. The project staff will prepare, pretest, and revise data-gathering instruments, paying particular attention to developing sampling methods with specific instructions that can be followed easily by library staffs with little statistical expertise. Site supervisors will travel to each of the approximately 10 percent of the state libraries participating in the study to observe, occasionally assist, and validate the completion of the instrument. Estimates for state totals will be developed by extrapolation. Participants will be requested to evaluate the efficacy, ease, satisfaction, and usefulness of the results. Recommendations for revisions as a result of the field test will be forwarded to ANSI Z39 Subcommittee 7.

Cost: 2 professional person-years, plus appropriate clerical and technical support and 30 to 50 days of professional consulting time. Other expenses will include printing and duplication costs, postage, data processing, and travel.

SUMMARY OF PROJECT 66: ESTIMATION MEASURES FOR PRODUCT/SERVICE CONSUMPTION IN LARGE INFORMATION SYSTEMS

Background: Large distributed network information systems, like ERIC and MEDLARS, provide access to materials through local libraries and information centers. Thus the products of these large systems are enhanced by the services surrounding them within the local outlets. Monitoring the consumption of large system products as they have been enhanced by services of local outlets requires collecting data from point where consumption takes place.

Purpose and Objectives: The measurement of the product/service unit of output at the local level is the focus of this proposed study. The consumption and utilization measures that will be estimated are measures of impact on the environment and will include volume of system output, patterns of usage, and number of people using system outputs. Longitudinal data will be collected to identify cyclical patterns in use of products/services.

The results of this study will benefit both researchers and managers through the provision of estimation techniques for measuring large information system impact. These will include time-frame factors, reliability of local data, and ease (or difficulty) of aggregating data from diverse local units. Other beneficiaries will be governmental policy-makers who often provide initial and continuing support for these large systems.

Methodology: The research design involves a survey with multi-stage stratified samples. A system with a number of products, numerous local outlets, and a cooperative attitude will be chosen, along with a state with a diverse population of these outlets. A first-stage survey will identify the set of product/services widely available at local outlets. The second stage would allow selection of one product/service for further study. Six outlets that can provide daily (or weekly) data on levels of usage for the selected product/service will be chosen. During the test period, all users who use the selected product/service at the six local sites will be counted and given personal interviews. The data from all six units will be aggregated for estimate of system level consumption, after first developing mapping procedures to make the six sets of data compatible.

Data collected in this study can support later simulation studies comparing efficiency and effectiveness of alternative means of monitoring use of system resources.

Cost: 2 professional person-years, plus appropriate clerical and technical support, and 6 on-site interviewers for approximately one month. Other expenses will include computer time and travel.

SUMMARY OF PROJECT 67: ELECTRONIC MEETINGS AS REPLACEMENT FOR FORMAL BOARD MEETINGS; CASE STUDY OF THE AMERICAN ASSOCIATION OF LIBRARY SCHOOLS (AALS)

Background: Travel costs have recently been increasing far more rapidly than the current rate of inflation. At the same time, new developments in technology make the idea of electronic meetings not only feasible but eminently practical. Many professionals already participate in computer networks on a regular basis. However, the use of this technology as a replacement for an association board meeting has not been reported. It raises some interesting behavioral and psychological questions, in addition to the obvious cost-effectiveness considerations.

Purpose and Objectives: One variable of interest might be the satisfaction of board members. Is part of the willingness to volunteer time to serve on boards a function of the pleasure in socializing and traveling? The behavior of people in groups is quite complex. For example, group norms develop, dominance is established, people assume specific functional roles within the group, and particular techniques for dealing with conflicts emerge. How will these and other aspects of group interaction change as communication is restricted to an electronic channel? The objectives of this proposal are to study these social/psychological variables and to record the adaptations made by one group to the computer conference format.

The beneficiaries of this study are the many other organizations that face the problem of information transfer and coordination among a small group of geographically distant people.

Methodology: AALS is planning to conduct some or all of its regular board meetings as teleconferences. The proposed project would take advantage of this change in procedure to study its effects on the board members and their interactions during meetings. A survey of all former AALS Board members from the past five years would be designed and completed. Validated instruments on group activities that score task function and group building-maintenance functions, and power and conflict resolution strategies, would be included. For a period of one year after implementation of teleconferencing procedures, the activities, perceptions and attitudes of the current Board members would be tracked. A complete case study would be developed along the lines of those used at the Harvard Business School. In the development of this case, information from the survey and a structured interview with the AALS Executive Secretary would be used to guide the collection of data to demonstrate sensitive changes that might be taking place. Ideally, a follow-up study after three to five years should also be undertaken, but this is not included in the cost estimate below.

Cost: 2 professional person-years, with appropriate clerical and technical support and travel and telephone costs.

SUMMARY OF PROJECT 68: EFFECT OF LEVEL OF TECHNOLOGY ON INTERNAL ORGANIZATION STRUCTURE

Background: In academic libraries and large public libraries, the number of non-professionals seems to be increasing in relation to the number of professionals. Does the adoption of various technological methods of providing both public and technical services change the staff ratio within the library? Does it also change the power structure? It has been argued, for example, that management information systems lead to increased centralization of authority and to greater managerial control, with a significant decrement in professional autonomy.

Purpose and Objectives: One objective of the study is to gather data to determine whether, with the increased use of technology, there has been a significant change in organizational structure that may have diminished the numbers and the autonomy of the professional staff. Other shifts in organizational structure that might be predicted include a lengthening of the lines of authority, an increase in non-librarian specialized staff, and a greater emphasis on quantifiable measures of efficiency rather than effectiveness.

Methodology: A small sample of academic and large public libraries, stratified on the type and extent of technology use in both technical and service functions, would be visited for two days each to collect data through records, surveys, and interviews. If possible, personnel records for the past ten years would be examined to determine if trends in numbers and kinds of personnel relate to the use of advanced technology. Directors would be queried as to what would happen if professional staff were to resign, e.g., how would each staff member be replaced? Job descriptions and advertisements would also be analyzed. A standard organization structure questionnaire would be administered to all staff within the organization to characterize the perception of power and influence, the degree of differentiation and integration, the manner in which decisions are made, the control and communication structure, techniques for handling conflict, etc.

Cost: 1 professional person-year, plus strong technical and clerical support and travel and computer time.

SUMMARY OF PROJECT 69: RELEVANCE JUDGMENTS AS A FUNCTION OF LEARNING AND RECONCEPTUALIZATION

Background: Information retrieval system effectiveness is usually measured by recall and precision, both of which are functions of the number of output documents deemed relevant. Thus, relevance judgments are a primary dependent variable for measuring retrieval success. Yet they exhibit a high degree of variance from one judge to another and even from a single judge over time. An information processing model from cognitive psychology may be useful in explaining the general instability of relevance judgments. One focus of the work on information processing focuses on semantic memory using speeded classification and verification tasks. Collins and Loftus view semantic memory as a non-hierarchic network organized around semantic distance. The model posits that a concept node is activated when a person sees or thinks about a concept. This activation spreads to adjacent nodes. The path between the two nodes supplies the information to evaluate a proposition about the concept pairs. This research proposes to use the Collins and Loftus model and experimental methods using reactions time to assess what happens cognitively when individuals make relevance judgments.

Purpose and Objectives: The objectives of this research are to test the value of the information processing paradigm to the measurement of information system effectiveness. The beneficiaries would be researchers in the information science field who would gain a better understanding of the key measures of information system effectiveness.

Methodology: This experimental study would involve the use of a computerized information retrieval system and, if possible, real queries and responses. An initial interview with each subject would result in an elaboration of the subject's query. This query would then be reframed into an associational cognitive map showing relationships among concepts and the properties of the concepts. Each query would then be searched in typical fashion. The citations-cum-abstracts would then also be mapped in a similar manner and a collinearity score would be computed. Subjects would then be presented with the citations, one at a time, and their reaction times for making relevance judgments measured. At the end of the session, the subject would be asked to restate his query. A new associative cognitive map would be developed and compared to the initial one to see whether it had changed in any direction or become more complex. The subject would then be asked to re-examine each citation in the same order as originally presented, verbalizing his thoughts as he processed each item. A pilot study of 20 or so subjects with three queries each would provide sufficient information to determine if a controlled experiment would be fruitful.

Cost: 1 professional person-year, plus appropriate clerical and technical support, 10 to 20 days of consultation time, computer time, and remuneration for subjects.

SUMMARY OF PROJECT 70: ELECTRONIC INFORMATION TRANSFER

Background: The costs of transferring information by means other than print have continually decreased, and one technology, television, has reached a level of economic feasibility and ubiquity to justify its consideration as an alternative to print in mass application. The French government, for example, has determined that it is more economical to provide the citizenry of France with terminals connected to an online telephone directory, rather than to continue printing telephone books. In this country, 36 percent of the homes with television receivers (nearly all homes) will have broad-band cable transmission by 1982. It is time to explore this technology as an alternative to print.

Purpose and Objectives: The purpose of this project would be to determine the utility of television technology (in the broadest sense) to alternative and new operational modes for the library. At least three specific technologies should be explored: cable television; video-text systems; and interactive information transfer. The project should characterize each of these in terms of existing practicality, economic feasibility, and interfacing with typical library operations. The objectives of this project should also include establishment of a range of potential experimental scenarios and measurement parameters across that range. The overall goal of this project is to characterize the technologies, present a series of application possibilities, generate experimental scenarios, and provide measurement parameters.

Methodology: The television technology to be used in this project is already available, in large quantity, in many communities across the country. Both the features of the technologies and of library operations are large in number and variant from community to community. This project is seen as a design study meant to serve as a precursor to a set of experimental projects. It is thus a "paper study" rather than a "breadboard." Basic data on the technologies and library operations should be collected; a set of experiments should be suggested; and an experimental framework should be established.

The results of this project should enable the designer of an experiment to:

- properly scope out his study
- have reasonably accurate guidelines of resources needed
- define the parameters he will study, and
- be able to visualize the relationship of his work to the overall problems

Cost: 1.5 to 2 professional person-years.

SUMMARY OF PROJECT 71: STORAGE TECHNOLOGY AND INFORMATION DELIVERY IMPACT

Background: The videodisk introduces an exciting possibility for a revolution in information storage. Optical disks compete favorably with paper for cost, with microforms for capacity, and with magnetic media for access under computer control. Videodisk applications are burgeoning. Sears has put its catalog on optical disks, Pergamon Press has released a videodisk collection of patent drawings, and IIT Research Institute has developed a prototype device for the transfer of print and/or computer-readable text to videodisk.

Purpose and Objectives: This project is concerned with the potential use of videodisks in libraries, information centers, and other organizations with large collections of archival information. The basic questions to be addressed are those of mechanism, cost, and acceptance. Optical disks will have to compete as storage media, but there are additional features of disks that may greatly expand their potential beyond that of mere storage, and those features add a new range of questions to be addressed. While the project must address the basic questions, it should also cover some of those raised by the unique capabilities of optical disks.

Methodology: The project suggested is that of the functional and system design of an information center based on storage and dissemination through videodisk and state-of-the-art computer technology for acquisition, organization, and circulation functions. The center would also transmit information electronically and explore novel information organization methods made possible by videodisks. Such a center would effectively be a laboratory for development and test of a revolutionary "library." Three major products would be generated through this project:

- a functional design, in terms of collection, services, and user population
- a system design, with specific selection of hardware/software/staff
- an experimental plan for the initial set of studies to be undertaken

Cost: 2 to 4 professional person-years (senior level library scientist, information scientist, and videodisk/computer technologist) for a period of 1 1/2 years. A sum equivalent to about 20% of personnel costs should be allotted for additional expenses (e.g., prototype system experimentation).

SUMMARY OF PROJECT 72: THE ELECTRONIC USER

Background: If several of the changes predicted for libraries and information centers come to fruition, the impact upon the users of those institutions is going to be large. Since the inertia of users may be very high, it is quite as important to explore the reaction to new technologies as it is to explore the technologies and methodologies themselves.

Purpose and Objectives: This project will attempt to see if the television-oriented generation will adapt to a TV-based technology for information provision. Since the project is to provide measures of behavior, it must be structured to compare similar populations served by different methodologies. In so doing, it must also determine the validity of the new method. This is a critical point. A key objective of this study should be to include the accurate performance measurement systems made possible by the modality.

Methodology: This project should measure the behavior of a selected population in performance of a typical library/information center service function through a new technologically-oriented methodology. One experiment that could be conducted with the available technology would be book selection and ordering (by a user population, not library personnel) via cable or closed-circuit television. Television would be used to present a subset of the collection of the library, and ordering would be done by telephone. Results would be obtained through measurements of system use (number of orders, time of day, percent filled, etc.) and through interviews with participants to determine attitudes toward the system. A control group using traditional techniques would be employed.

Cost: 2 to 3 professional person-years to build the database for the TV TV system, followed by 1 professional person-year of effort to conduct the study. There would be considerable cost for the TV system.

SUMMARY OF PROJECT 73: TO HAVE BUT NOT TO HOLD

Background: Currently, the entire operational modality of libraries and information centers is keyed to items: books and journals are selected, ordered, received, cataloged, shelved, and circulated. However, as technology makes the sources more ephemeral and the transmittal of information easier and more varied, a new orientation will have to develop that is transaction-based rather than item-based: an alequot of information will be transmitted from originator to organizer to users, and it will be the transactions that can be measured, counted, controlled, and paid for.

Purpose and Objectives: The purpose of this project will be to determine the implications of a transaction-oriented information society on library/information center operations. The objective of the project will be to predict impact and propose actions.

Methodology: The proposed approach is a Delphi study. A group of information scientists would define the parameters of the study by generating a set of scenarios for review by a body of librarians/information scientists. Each such scenario would briefly describe what might happen. Participants in the Delphic study would be asked to concentrate on the implications of the scenario on a set of parameters provided by the originating group. After iteration, it should be possible to determine which factors are likely to be the most important, most difficult to solve and most likely to occur. This would provide direction for experimental studies exploring the alternatives.

Cost: Approximately 3 to 5 person-years over 1-1/2 to 2 years. (This would be an ideal experiment to conduct through the use of an electronic mailbox system.)

SUMMARY OF PROJECT 74: KNOWLEDGE DELIVERY SYSTEMS

Background: Some work in the field of Artificial Intelligence (AI) suggests that it may be possible to have computer software "read" an information store with "intelligence" and provide a user with meaningful information, rather than simply a book, a journal article, or some other information container. Words have meaning to people because they can associate them with an integrated set of experiences. If a computer program could be given an experience base, it, too, could sense the meaning in words. The rapidity with which processing speeds are increasing and processing costs are decreasing make this a possibility in the near future.

Purpose and Objectives: There are two sub-areas of AI research that deserve special attention from the library and information science communities: natural language processing and world-set definition. Natural language processing may be used as a tool to improve the efficiency or user-acceptance of traditional systems, while world-set definition gets to the basic objectives of AI research. Projects that address either could range from a user-friendly conversational card catalog to a schema for representing historical observations in an AI system. Results of the first type of study might be reducible to practice in the very near-term, while results of the other might provide only a framework for the beginning of a succession of projects over considerable time before a practical application was reached. To maintain a balance of constraint with basic research freedom, AI projects should address one of these two questions and postulate a useful application.

Methodology: Research in this project area will almost certainly be experimental. If studies are proposed that are not aimed at a near-term application, an extensive peer-review process is indicated. Some possibilities, such as the conversational catalog mentioned above, might be performed as pilot studies in a typical library or information center environment. Such a system could almost assuredly be built with available technology. The approach in this case would be to define a reasonably exhaustive set of likely requests of the system, build the language processor, map the user language to the Aristotelian categorization of the particular classification system in use, and proceed to an experimental test. However, projects that are relatively straightforward in design (like the oversimplified idea above) are the ones of least excitement and potential benefit.

Cost: Several studies are needed in this area. Any given project should be in the range of 1 to 2 person-years of effort, with provision for computer resource utilization at 10 to 20 percent of the personnel time rate.

SUMMARY OF PROJECT 75: PRESERVATION AND PROTECTION OF NON-PRINT MEDIA

Background: Librarians are frequently caricatured as curators of collections whose ultimate goal is to keep information safely on shelves and in file boxes. Although recent emphasis has been placed on the necessity to use, not just store, information, the preservation of informa- tion is still an important function that libraries and information centers perform. There are a large number of original works that have instrinsic value. Beyond that consideration, however, and more germane to non-print media, is a body of material (e.g., art works, films) in which only the original truly encompasses the information.

Purpose and Objectives: This research project is aimed at the development and trial of the use of an electronic storage technology for the long-term preservation of non-print media with as much fidelity as possible. It is restricted to one technique: multichromatic film information preserved on videodisks. The major degradation factor affecting film has to do with color fidelity, and the current situation is analogous to that of books. Just as post-World War II papers are of lower quality than earlier papers (because of high acid content), so current color films, though less expensive, are more subject to color degradation. While close replicates can be made, the very nature of dyes precludes exact duplication. This project is designed to explore the feasibility of preservation of such film materials by means of electronic storage.

Methodology: This project is experimental. Techniques for vidiconscanning of color film (for purposes of putting film content on videotape) are well established and, under computer control, color fidelity can be maintained. Videodisks would seem to offer the ideal preservation medium: shelf life is projected to be centuries, use has no effect on the storage medium, and it is possible to make one-for-one replicates. This study should address the types of materials to be preserved, establish the resolution necessary for replication of the detail in the original, define the system specifications for conversion to disks, generate sample materials on disk, and provide accurate cost data. The results of the project should indicate the technical feasibility of such a technique and present the investment and operational costs to be expected. A prototype system should be constructed and simple materials converted.

Cost: 3 to 5 person-years over 2 years, plus an equipment budget of $100,000 to $250,000.

SUMMARY OF PROJECT 76: STRUCTURE-FUNCTION RELATIONSHIP IN VIEWTEXT INFORMATION SERVICES

Background: Collectively, the viewtext home information services technologies are extremely versatile. Individually, each is limited in the information content that its production and distribution system can accommodate. For example, teletext service using the TV vertical blanking interval is limited to a few hundred pages of text because of recycle time, and videotex service using a common carrier cannot economically transmit pictures or high-quality graphics.

Purpose and Objectives: An analysis of the relationships between the structure of each viewtext technology and its optimum functions will help to clarify decisions that public-service stakeholders and the public must be ready to make in the next few years.

Methodology: The dimensions that help to differentiate viewtext technologies include:

(1) transmission vs. non-transmission systems
(2) general purpose vs. special purpose systems
(3) interactive capability
(4) narrow-band vs. broad-band transmission
(5) user interface
(6) computer configuration
(7) public vs. private databases
(8) public vs. private delivery systems
(9) regulatable vs. non-regulatable delivery systems
(10) regulatable vs. non-regulatable content

Posed against these structural dimensions are the functions that public-service stakeholders are interested in deriving from viewtext services. These functions include:

(1) announcement or current awareness functions
(2) reference or retrieval functions
(3) instructional functions
(4) entertainment functions

The methodology of the study is that of a features analysis. Data on existing and proposed viewtext technologies will be assembled and synopsized according to structural dimensions, including, but not limited to, the ten listed above. From a resulting "structural profile" of each viewtext technology, its suitability for each information function will be scaled. The result of this analysis will be a directory of existing and proposed viewtext systems, cross-indexed by structural dimensions and by functions.

Cost: 0.5 professional person-year, with non-professional staff support (approximately $30,000).

SUMMARY OF PROJECT 77: FORMATS FOR VIEWTEXT DISPLAYS

Background: Evaluated solely as displays of printed information, viewtext systems leave much to be desired. Character sets incorporated in decoders are usually upper case only. The American household TV set general permits a display of only 20 lines of 40 characters each, and many American viewtext systems display only 16 lines of 32 characters, which is less than one-fourth of an average book page. Users are accustomed to seeing hundreds of words of context around each sentence that they read in books, magazines, newspapers, etc. A viewtext screen of 75 to 100 words provides little context for reading each sentence. The limitations of viewtext displays of printed information may be more than offset, however, by dynamic display features in viewtext systems that have yet to be developed beyond laboratory prototypes. Unlike the printed page, the viewtext screen can transform itself "before the viewer's eyes" from a text page to a map or graph, to a statistical table, or even to an animation.

Purpose and Objectives: This project proposed to explore and evaluate the dynamic display features of selected systems. The definition of "dynamic display features" is itself an important milestone within the research project, since "dynamic" may mean:

(1) motion on the display screen, the purpose of which may involve either content or technique;
(2) responsiveness of the system to unique information that the user has provided, such as his or her preference for data in the form of graphs rather than statistical tables.

Methodology: This project incorporates a brainstorming phase in which both viewtext experts and users have an opportunity to share suggestions for dynamic display features. The conceptual work of this project is to create a taxonomy of dynamic display features, cross-indexed by display purpose and technique. When the taxonomy includes 20 or more features of diverse types, the focus of the project will shift to field trials of the most promising features. Data will be collected on both the implementation and operating costs of the features in a diverse group of operating viewtext systems. Where either category of costs proves to be prohibitive, a less expensive method of approximating the same feature should be found.

Cost: 0.5 professional person-year, plus $50,000 in software development costs ($5,000 for each feature implemented), or approximately $80,000.

SUMMARY OF PROJECT 81: CONSORTIUM ARRANGEMENTS FOR COMMUNITY LIBRARY INVOLVEMENT IN VIEWTEXT INFORMATION SERVICES

Background: The community library, which is a principal stakeholder in the success of viewtext home information services and which has a unique role as a viewtext information provider, is severely constrained in participating in viewtext experiments by its charter and revenue base.

Purpose and Objectives: Although few community libraries are yet involved in consortium arrangements whose specific purpose is to provide viewtext home information services, there are many examples of interlibrary consortium arrangements, as well as interagency consortium arrangements involving libraries, that suggest possible bases for library involvement in viewtext consortia.

Methodology: This project will begin with a six-month phase of case-by-case analysis of a stratified sample of community libraries. After a structured questionnaire is developed from data obtained in the case studies, the second phase will consist of a mail questionnaire survey of a much larger stratified sample of community libraries.

Cost: 0.5 professional person-year of effort will be required over a one-year period, divided equally between the first and second phases of the project. There are $10,000 additional data acquisition and analysis costs. Total cost: $40,000.

SUMMARY OF PROJECT 83: HUMAN FACTORS IN SYSTEM DESIGN

Background: As automated information systems become integral parts of both the internal operations and the user-oriented (even user-operated) services, the "human factors" engineering of these systems will become increasingly critical. An issue as trivial as the "aspect ratio" of a standard video display, compared with that of a normal printed page, can result in major complications as one tries to combine video graphic images (say of printed or typewritten pages) with digital data.

Experiments on the readability of video displays began being carried out at least ten years ago (see Schade, Ott H. Image Quality: A Comparison of Photographic and Television Systems. RCA). Yet we do not seem to have even begun to identify the relevant aspects of the physical and operational relationships between users and library-based information systems--not even to talk about establishing benchmark values for the parameters involved.

Purpose and Objectives: The objectives in this set of research projects are twofold: first, to identify the relevant human factors parameters and, second, to establish the benchmark values for them. The issues involved relate not to the substance of the information provided or even to the process or procedure by which information is obtained but, instead, to the physical aspects of the communication process:

- Format of displays
- Image intensity
- Resolution
- Speed of transmission
- Pace of system response
- Flicker rate
- Ambient light
- Multiplicity of display
- Keyboard layout (especially of special function keys)
- Quantity of information displayed

These obviously are a bare start in identifying the relevant factors, but they do suggest the kinds of issues involved.

Methodology: The research methodology is almost completely experimental, in which factors considered as potentially important are experimentally identified, and then ranges of the parameters involved are tested for their effects. Experimental testbeds will need to be created, in which the operation of an information system can be simulated, with the variables carefully controlled and with the test or independent variables exercised through the ranges of interest. To illustrate, the "readability" of a display will need to be measured in terms such as "error rates" in recognition of data; then the effects of variables such as font size, line length, coding, intensity, etc. can be evaluated for their effects on readability as so measured.

Cost: 5 person-years.

SUMMARY OF PROJECT 85: THE EFFECTS OF "UNCERTAINTY" ON SYSTEM PERFORMANCE

Background: For years there has been debate in information retrieval theory about the extent to which "precision" and "recall" are inverse functions (i.e., about whether an increase in recall necessarily--or, at least, on the average--implies a decrease in precision). My own hypothesis is that they are, and that the reason they are is simply the effects of uncertainty, as measured, for example, by "inter-indexer (in)consistency," in the assignment of terms. Furthermore, those effects are amplified, not reduced, by going to natural language systems, and for the same fundamental reason, namely, the uncertainty in the use of terms by authors and requestors.

In principle, this issue should be answerable by mathematical analysis, in which the effects of a postulated level of uncertainty can be predicted and the predictions then tested. (It is important to note that I am not suggesting an absolute relationship, but a statistical or probabilistic one, so the testing will need to be a statistical testing.)

Purpose and Objectives: The purpose is to determine whether the relationship between precision and recall is the result of the more fundamental system parameter and, if so, to establish the basis for measuring system performance and for improving that performance.

Methodology: The study approach involves two stages: first, a mathematical analysis by a person competent in combinatorial methods to establish the relationship between "uncertainty" and retrieval performance, and, second, to test the predicted behavior on an experimental basis.

Cost: The mathematical phase is 1 person-year; the experimental phase involves about 5 person-years, plus processing time for running test queries.

SUMMARY OF PROJECT 86. HISTORICAL RELATIONSHIP BETWEEN LIBRARY AND INFORMATION SCIENCE

Background: During the past ten to twenty years, library science and information science have merged into a combined discipline, but they have done so with varying degrees of compatibility and mutuality. There appears to be a common core of interest, but there also appears to be significant divergence in origins and methodologies. The question raised by this project is the extent to which the current pattern of interaction is similar to that at other periods of history. Examples published in the literature can be cited to illustrate: (1) the interactions among Billings, Fletcher, and Hollerith, (2) the interactions among Panizzi and Crestadoro, (3) the possible interactions among Panizzi, de Morgan, and Babbage, (4) the relationship between NLM and the development of computer-controlled photocomposition.

Purpose and Objectives: The hypothesis underlying the proposed research is that the "library problem" (the library catalog as a problem, in particular) has had an effect upon the development of technology at times in history other than simply the most recent decades. The purpose of the project is to establish links between the two components of the discipline that will demonstrate the historical connection between them.

Methodology: The study approach will focus on specific individuals and technical developments, with the aim of establishing links between those in libraries and those concerned with development of information technologies and information handling concepts. The research requires identifying documents such as correspondence that relate to those individuals or, better yet, relate them together.

Specific contexts to be considered are the following:

- The development at the Smithsonian Institution of concepts for using technology to produce a national union catalog, an international catalog of scientific publications, etc.

- The development by Babbage of the "analytical engine" for the identified purpose of printing (of navigation tables), a development that could have been applied to the British Museum Library catalog.

- The known relationship between Billings and Hollerith in the development of punched cards for statistical process, but with recognition of Billings and Fletcher's interests in production of Index Medicus.

Cost: This is a long-term effort--perhaps five years--but at a level of effort representing about 20% time. Hence 1 person-year for the principal investigator, plus support by research assistants at a level of about 2 person-years, plus travel (for examination of relevant documents).

SUMMARY OF PROJECT 87: RESEARCH PRODUCTIVITY BY FACULTY OF LIBRARY AND INFORMATION SCIENCE

Background: I have just completed an analysis of the rates of publication and citation for all tenured-level (i.e., Associate and Full Professor) faculty of schools of library and information science. They show that the general level of research productivity is low, with a few of them publishing and being cited at a high rate, but the majority of them at a very low rate, and a substantial number not at all.

This kind of analysis needs to be made on a continuing basis but, beyond that, the conditions that lead to high or low research productivity need to be identified.

Purpose and Objectives: The purpose is to establish benchmark data for the evaluation of faculty as the basis for personnel actions in appointment and promotion (especially to tenured-level positions). It is also to determine what can be done to raise the level of quantity and quality of research in the field.

Methodology: The current analysis has been based on the publication and citation data derived from the Social Science Citation Index and the Science Citation Index for the past 15 years (for all of the tenured-level faculty). At the moment, however, the analysis has been purely descriptive, with only a minor effort to relate rates of publication to other variables.

The study approach will therefore involve the following steps:

(1) Maintain an updated file on all faculty, non-tenured as well as tenured, from year to year

(2) Add variables to the file for each individual that may be relevant determinants of research productivity (such as undergraduate major, time of professional lbrary experience, age, area of research focus or teaching focus, school granting doctoral degree, etc.)

(3) Test the effects of specific variables, especially over time, on the rates of research publication.

Cost: Currently, the cost is about 0.1 person-year of principal investigator time plus about 0.25 person-year of research assistants.

SUMMARY OF PROJECT 88: ROLE OF SPECIALIZATION IN LIBRARY EDUCATION

Background: Library education is experiencing some major changes, as schools try new approaches to their curriculum, such as "the core curriculum" and the "two-year program." Underlying many of these experiments is concern about the proper role of "specialization" in library education. Some specialties, such as medical librarianship, have established their own requirements for certification. Others have tried to maintain the view that librarianship is "universally applicable" and that specialization should not be part of library education.

Purpose and Objectives: The aim of the project is to establish criteria for evaluating the extent to which a library school provides preparation for specialized work and the level at which it prepares its graduates for such work. This will provide standards against which a school can measure its own objectives, as well as providing a means for students to evaluate schools in terms of their objectives.

Methodology: The study would involve the following major steps:

(1) A review of the literature concerning specialization, including the Dictionary of Occupational Titles, the announcements of the several professional societies, and the professional library literature

(2) Commissioning a set of papers of specific aspects of specialization

(3) An analytical study of aspects of specialization, including: how are specializations to be characterized; what are the various levels of preparation for specialization; and how can the education for various levels be provided?

(4) A Delphi-process series of questionnaires, in which a selected panel of about 30 experts explores issues related to specialization, with emphasis on educational aspects.

Cost: This will require about 5 person-years per year, for a two-year period, plus the panel of experts participating in the Delphi process.

SUMMARY OF PROJECT 89: UTILITY, FEASIBILITY, AND POSSIBLE STRUCTURE OF A RECOMMENDED NATIONAL PROGRAM FOR EDUCATION OF LIBRARY AND INFORMATION SCIENCE PERSONNEL (a new project that recasts project 29 and supersedes it)

Background: Problems abound in library and information science education. However, questions regarding the content of educational programs should not necessarily precede the issue of whether the personnel training needs for library and information services could be met more effectively through a planned national structure of educational institutions. The questions posed by this study do not imply solution by regulating the total number of students in the field but will address questions related to the levels of faculty and student body size and institutional support below which quality education programs in the field cannot survive.

Purpose and Objectives: This project seeks to identify the essential aspects of library and information science education and the changes that must be made in the present system to provide adequate training for library and information science professionals. The specific objectives of the project are:

(1) To bring together practitioners and educators to identify the essential aspects of professional library/information science education

(2) To identify the essential aspects of library/information science education

(3) To identify the resources needed to support programs of library/information science education

(4) To communicate the results of this project to relevant bodies

Methodology: This project is an exploratory study. A principal investigator will summarize the history and present state of library and information science education. Up to 25 professionals from a variety of academic and professional fields will read the background paper and then meet in a two-day conference to address the questions of utility and feasibility of the concept of a national structure. If the group concludes that such a structure would be both worthwhile and feasible, the principal investigator will develop a proposed structure for review by members of the group. A second draft and review cycle will be followed by the production of a final report outlining the recommended national structure. The report will be disseminated to library/information science school administrators, accrediting agencies, and other interested parties.

Cost: 1 professional person-year, plus expenses for the two-day conference.

SUMMARY OF PROJECT 90: FULL-TEXT RETRIEVAL (a new project)

Background: Word processing creates large quantities of unstructured full-text information. Technology is just now arriving to help use this information, but the technology has not been evaluated even for the quality of interface, much less for the value and quality of information retrieval. We have never before had such large databases of unstructured, natural-language material to process. We also cannot afford to index, classify, and organize all of this, as we have in the past. Users perceive that they want access to this, with instant, full-text retrieval. Can we, as information professionals, help to evaluate the technology and to make it truly useful?

Purpose and Objectives: To evaluate information retrieval on large, unstructured, natural-langauge text files; to examine satisfaction levels for two groups in full-text retrieval; and to get a sense of the dimension of the problem.

Methodology: The project should be an exploratory study, using one or more of the existing technologies (IBM 8100-STAIRS, SDC Records Manager, Burroughs OFIS 1, Xerox STAR, Datapoint AIM) to test the quality of retrieval and to understand the information-seeking behavior of several populations. One of these populations should be business professionals and one, scientific professionals, because the language of each may present different problems. For example, business language may be non-specific, while scientific language may require synonym connection.

Each group should be large enough (perhaps 30 persons) to be statistically valid. The steps would be to

(1) analyze literature to determine the information requirements of each of the two groups

(2) analyze the retrieval characteristics of the major text retrieval systems

(3) expose the users to the technology for retrieving the data that they and their colleagues have created

(4) interview the users to identify problems and determine satisfaction with the full-text information retrieval process.

Cost: (Not specified)

SUMMARY OF PROJECT 91: IMPROVED INDEXING CAPABILITIES ONLINE (new project that provides addendum to purpose and objectives of project 56 and incorporates project 63)

The research questions to be answered are the following:

(1) What subject authority files for databases and library catalogs exist in machine-readable form?

(2) Which of (1) are being used in online searching?

(3) How are basic indexes (inverted files for searchable fields) linked to these subject authority files?

(4) Which dictionaries and glossaries exist in machine-readable form?

(5) Is it feasible to build an online searching capability combining (1), (3), and (4) for given subject areas?

(6) What features of online retrieval systems aid in the search process at the stage of choosing terms to search? (Project 63 is an example of one specific study in this area.)

(7) How could online retrieval systems be redesigned to include more aids for revising search strategy and vocabulary choices during the search?

The project would test a prototype system that is developed to incorporate the features uncovered in questions (5) through (7) above.

See projects 56 and 63 for details.

Costs: Same as original Project 56.

SUMMARY OF PROJECT 92: ADOLESCENT INFORMATION BEHAVIOR (a new project combining projects 55 and 64)

Background: Children in junior high schools and high schools today will live as adults in a society whose information dimension is significantly different from their parents'. They will work, play, continue to learn, and care for others in an information-rich, media-saturated, electronically linked society. Their effectiveness in choosing and achieving educationally and occupationally is affected by their ability to cope with information sources. The nation's 10,000+ high school libraries have the potential to support effective adolescent information behavior. This potential is limited, in part, by a non-existent base of knowledge about adolescent informaton behavior. Two projects exemplify how the knowledge base could begin to be established.

> Project 55 (Direct and Quick Informaton and Retrieval Service in a School Setting) focuses on use of current technology to reveal adolescent questions, topics, and search behavior in a learning environment.
>
> Project 64 (From Childhood to Adolescence; Changing Information Needs) focuses on identifying situations in which an adolescent population uses information in dealing with specific life tasks.

In both studies the literature on adolescent psychology and adolescent sociology could be synthesized to contribute to structuring the data-gathering.

(See projects 55 and 64 for details.)

SUMMARY OF PROJECT 93: INFORMATION-SEEKING BEHAVIORS OF CHILDREN AND YOUNG ADULTS (a new project combining aspects of projects 55, 8, and 64)

Background: There is a need to research the information-seeking behaviors of children and young adults as these behaviors relate to a radically altered information environment, including:

- the multiplicity of information-bearing resources available, e.g., books, television, film, and computer-generated data;
- multiple site possibilities for accessing information, e.g., school library media center, public library, and home;
- the national debate over the positive or negative qualities of the impact of the non-print media upon the learning and behavior patterns of children and young adults.

Purpose and Objectives:

- to provide information about the ways that various media formats may be used most effectively to stimulate divergent thinking among young learners;
- to identify utilization patterns that expand or circumscribe access to media information formats;
- to examine the learner's perceived level of satisfaction with various media informaton formats as information providers;
- to develop, through situational analysis, a means for determining how library media programs may best meet the information needs of children and young adults.

Methodology:

(1) Survey and interview methods, both to take into account existing capabilities and technologies;

(2) Experimental situations to study information-seeking behaviors. Identify appropriate research environments (e.g., urban, suburban, or rural school and public library sites) and age range (8 to 20 is suggested). A large national sample should be developed.

Cost: 2.5 professional person-years, plus an interviewer force and computer time.

SUMMARY OF PROJECT 95: ALTERNATIVE FUNDING POSSIBILITIES FOR PUBLICLY SUPPORTED LIBRARY AND INFORMATION SERVICES (a new project combining projects 33, 11, and 51)

Background: Public libraries currently derive 82 percent of their support from local government. Most of this public funding is drawn from local property taxes. With the recent cuts in property tax that have been adopted across the country, public libraries are experiencing sharply declining support.

This situation has caused library administrators to explore alternative funding possibilities. One alternative is the use of fees for specific services. Though controversial, fees have been used by some libraries.

The need to identify additional sources of funding and to examine the impact and potential use of fees is great. Projects 33, 11, and 51 are examples of approaches to this problem. They are presented here as a single package.

(See Projects 33, 11, and 51 for details.)

SUMMARY OF PROJECT 96: LIBRARIES AS A MECHANISM FOR DISSEMINATING "GOVERNMENT INFORMATION" (new project)

Background: Federal legislation frequently authorizes the establishment of new "information centers" to collect and/or disseminate information. Libraries have been co-opted for government information dissemination activities only through the depository library program.

Purpose and Objectives: The purpose of this research project is to determine whether public and academic libraries can operate as the mechanism to achieve federal information collection and/or dissemination objectives, so that new mechanisms need not be established.

Methodology: This two-phase research project will consist of:

(1) Analysis and on-site data collection at ten information centers established within the last four years. The purpose is to develop a model or models of the operational requirements of information centers.

(2) Focus groups consisting of 10 to 15 library directors will be asked to review the models and determine whether these activities can be carried out effectively by public and academic libraries. If so, what barriers exist to libraries' participation? If not, under what changed conditions could libraries participate?

Cost: (not specified)

SUMMARY OF PROJECT 99: CHARACTERISTICS OF ELECTRONIC PRESENTATION AND DELIVERY (a new project combining projects 3, 73, 74, 76, and 77)

Background: It is pointed out in the following projects that a new medium like electronic information delivery begins by emulating the characteristics of the media whose functions it displaces. Later, unique characteristics of the medium are explored, and it begins to convey messages in a different way than its predecessors.

Each phase in the development of electronic information delivery systems will be expensive, and early phases will not be as effective in conveying information as later phases. There is reason to telescope the early development phases as much as possible in order to provide library-based and home-based services that are well-accepted both by information professionals and by the public.

The projects groups here deal with four topics:

(1) Differences between paper and electronic publication
(2) The legal, economic, and other aspects of electronic documents
(3) Applications of artificial intelligence research and natural language processing research in providing adaptive access to electronic information delivery systems
(4) Features of electronic displays and their associated hardware that establish preconditions (both opportunities and constraints) for information presentation.

The projects that fall in this section are:

Project 03: Exploiting the True Capabilities of Electronic Publication

Project 73: To Have but Not to Hold

Project 74: Knowledge Delivery Systems (not a good title)

Project 76: Structure-Function Relationships in Viewtext Informaton Services

Project 77: "Post-Gutenberg" Formats for Viewtext Displays.

SUMMARY OF PROJECT 101: DIRECT DELIVERY TO USERS (a new project combining projects 70, 72, 41, and 78)

Background: In addition to the role of libraries as a delivery channel, these electronic media are amenable to direct delivery to the penultimate user through existing or about-to-exist ubiquitous mechamisms in dwelling- and working-places.

Purpose and Objectives: Two generic questions are addressed by the research projects in this section:

(1) What are the characteristics of the direct delivery technologies and how could their utility be assessed?
(2) What are the characteristics of the users of the direct delivery systems?

Methodology: The study approaches are given in the following three projects:

(1) Combination of
    Project 70: Characteristics of Direct Delivery Techniques, and
    Project 72: The Electronic User

(2) Project 41: The Role of Electronic Home Delivery Systems in Meeting Information Needs of Citizens

(3) Project 78: Impact of the "New Literacy" on the "Knowledge Gap" Between Demographic Groups.

Projects 70 and 72 are readily combinable. The other projects (41 and 78) address two related but distinct questions.

Cost: Costs are given in each project description.